PAINT and VARNISH Production

THE TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHES

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VEMBER
1953

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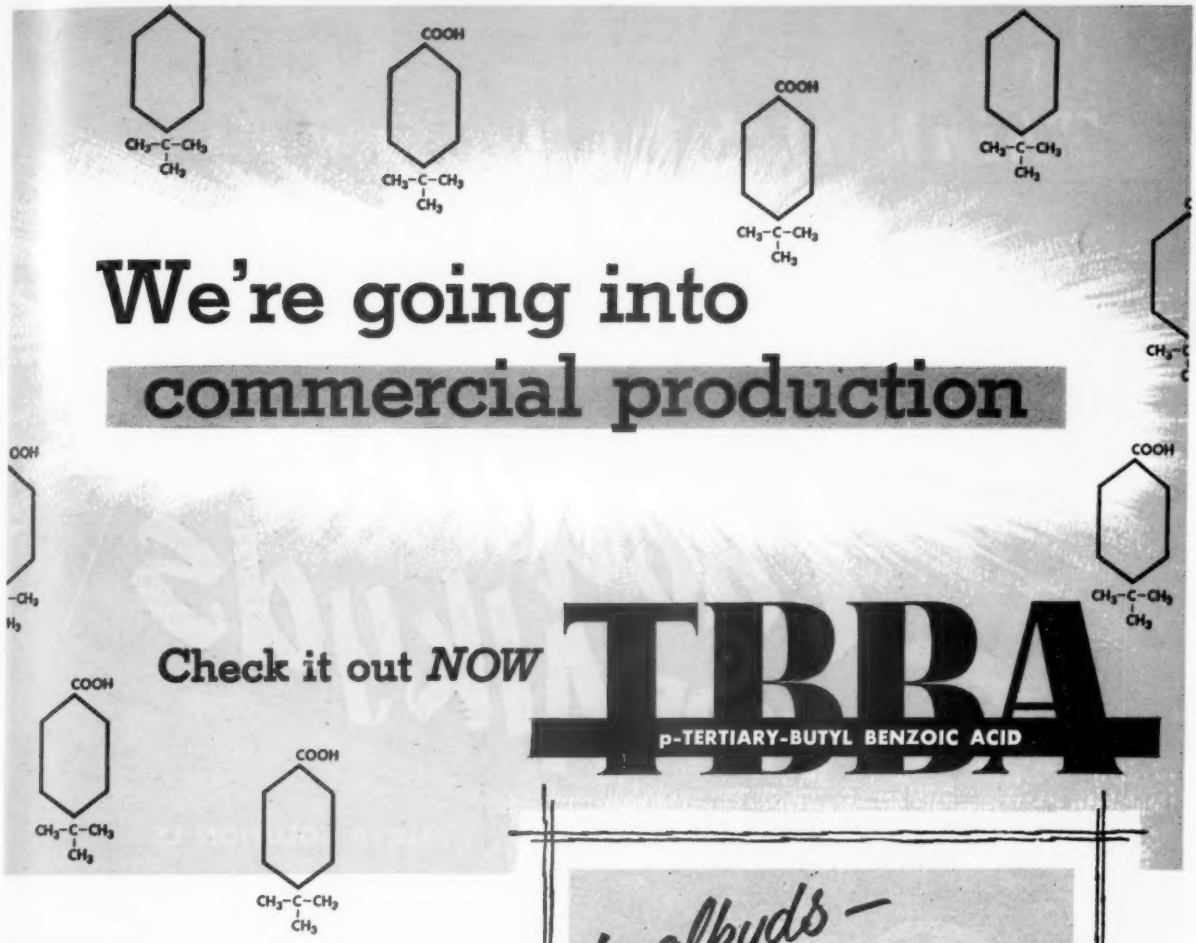

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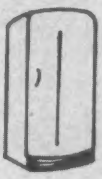

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Formerly PAINT and VARNISH PRODUCTION MANAGER
(Established in 1910 as The Paint and Varnish Record)

VOL 43 NOVEMBER, 1953 NO. 11

NEXT ISSUE

The December issue will feature an article dealing with a study of metal-phosphate coatings on steel as a base for paint application, and the effect these coatings have on paint bonding. It is particularly concerned with the problem of comparing the amount of insoluble phosphate coating matter which is produced during the application from a water solution of the initial material and with a study of the effect of subsequent and still-water-soluble matter on the phosphate coating when the paint system is applied.

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Editorial Comment

"Do-It-Yourself" Gets Top Billing

THE "Do-It-Yourself" market got a thorough going over at the recent convention of the National Paint, Varnish and Lacquer Association at Atlantic City, N. J.

At the Wholesale-Distributors Division Meeting, William M. Stuart, president of the Martin-Senour Co., said that the "Do-It-Yourself" market has opened great vistas of expansion for the industry.

He pointed out that the "Do-It-Yourself" market was spurred by a "new aristocracy"—the laboring man who works for an hourly wage and enjoys a five-day week and paid vacations, which have enabled him to perform personally many of the jobs around the home he previously had to contract for.

Another significant factor in the growth of the "Do-It-Yourself" market has been the trend to build homes "easy to paint not only on the inside but the outside." Mr. Stewart referred to the ranch-type home which can be painted by the dweller with the help of only a step ladder.

Considerable attention of the Advertising and Sales Promotion Managers' Discussion Forum was focused on the painting contractors' attitude of the manufacturers in fostering "Do-It-Yourself" promotion.

Opinions of the members varied. One believed that resentment among the contractors was nonexistent, and no problem existed.

However, contrasting opinions emphasized the seriousness of the problem and solutions were offered, one of which was a campaign selling the idea that people with annual incomes under $10,000 are unable to hire the services of a painting contractor and therefore there is no real loss in business for the contractor.

Another member believed that the crux of the problem lay in the "loss of face" among contractors because the "Do-It-Yourself" promotion tears down the concept of craftsmanship.

In this connection, it is interesting to point out that the reason behind the unpopularity of latex paints among paint contractors is the fact that latex paints have been particularly identified with the "Do-It-Yourself" consumer, and as a result the contractor wants no part of it. It has been often pointed out that the tremendous growth of latex paints, because of their unique application properties, has been directly attributed to the "Do-It-Yourself" market.

Members attending the Trade Sales Manufacturers' Forum, urged that the Association finance an all-out nationwide "Do-It-Yourself" campaign. It was also recommended that money for the campaign be solicited from all trade sales manufacturers as well as all classes of membership.

However, A. A. Shuger, chairman of the forum, warned the independent paint dealer that big chain retailers such as super markets and drug chains may encroach upon their business.

He described the big chains as a "force which obeys no law but their own appetites," and further stated—

"Their power is bound to be felt and only a few large manufacturers can possibly benefit from this situation.

"We must think of protecting our own jobbers."

Mr. Shuger also advocated that the "Do-It-Yourself" market be promoted to its fullest extent as it will mean a substantial boost in paint sales. He urged for full cooperation from the dealers in merchandising campaigns to include attractive window displays and modernization of selling organizations.

Promotion of the "Do-It-Yourself" market has indeed created quite a furor and the full impact from this market is yet to be felt. However, manufacturers engaged in trade sales cannot overlook the importance of the "Do-It-Yourself" trend and sooner or later must give this potential market careful consideration.

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PUBLISHED BY EDGAR BROTHERS COMPANY — METUCHEN, NEW JERSEY

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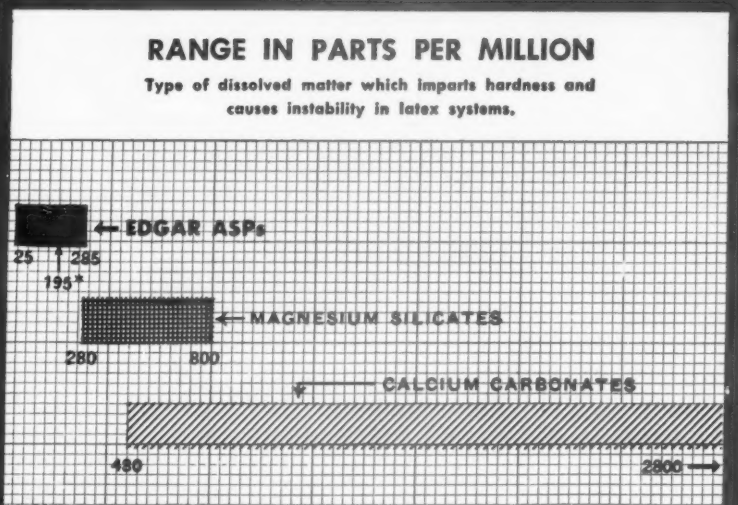

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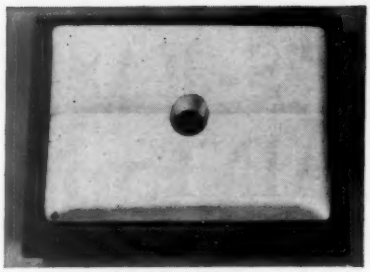

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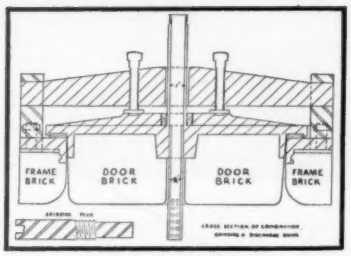

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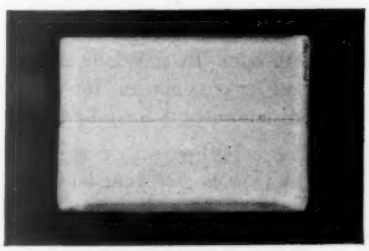

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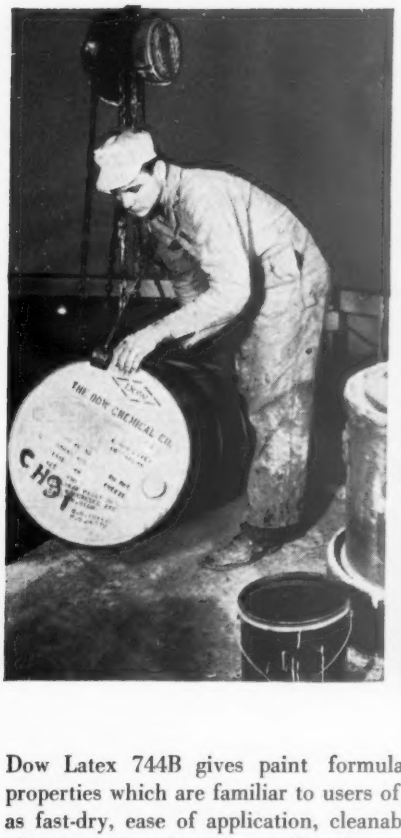

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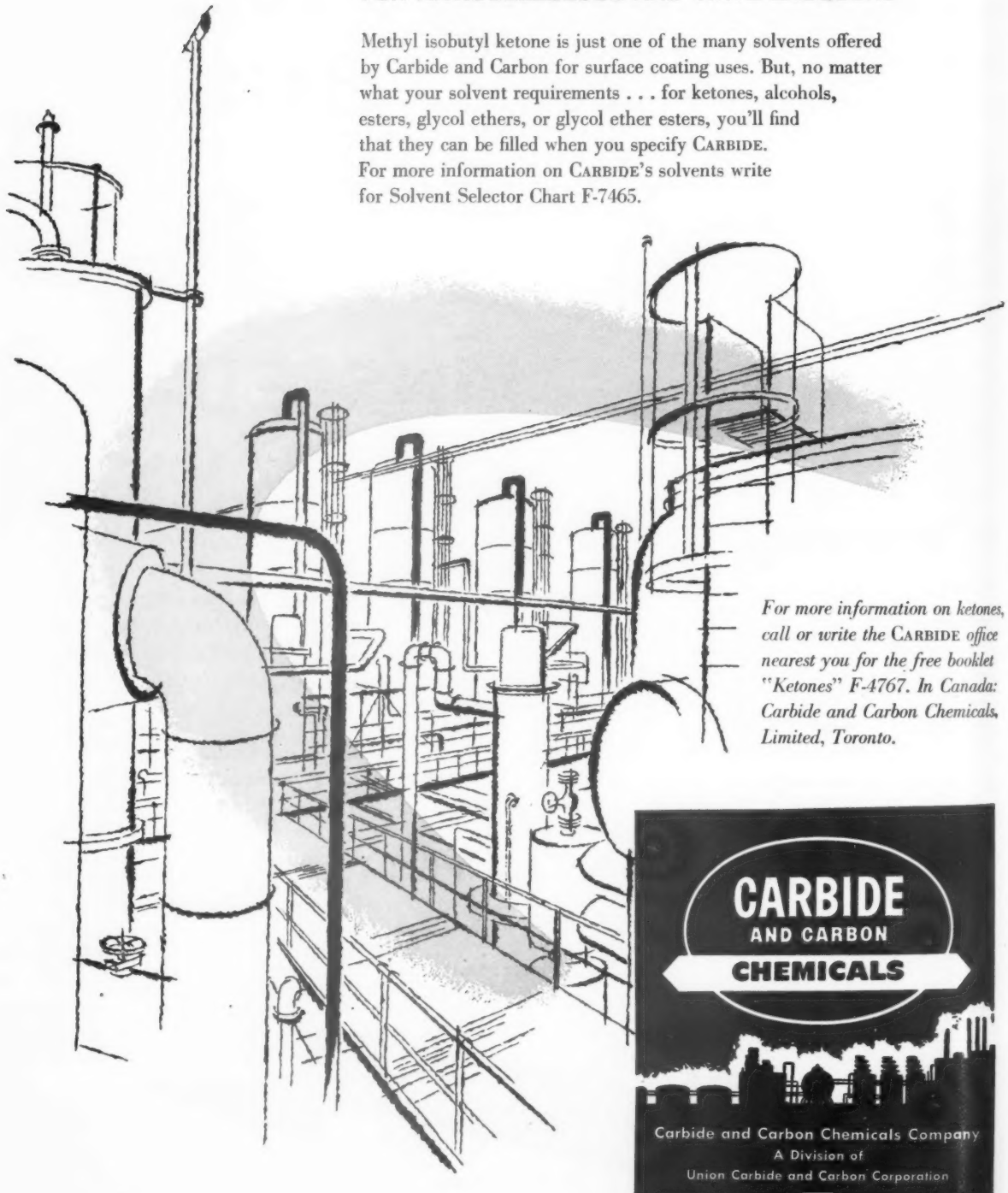

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They chained a tree to keep a kingdom alive

People once believed their lives were bound to the fate of certain trees. An old oak which stood in the village of Oster Kappeln was the "life tree" of the German royal family.

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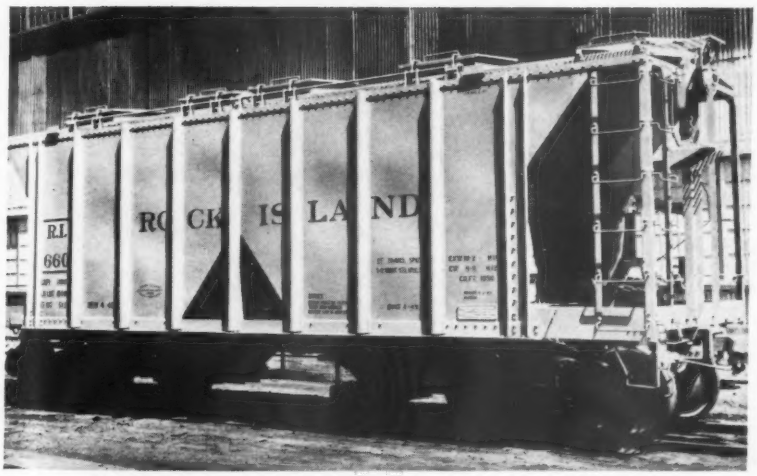

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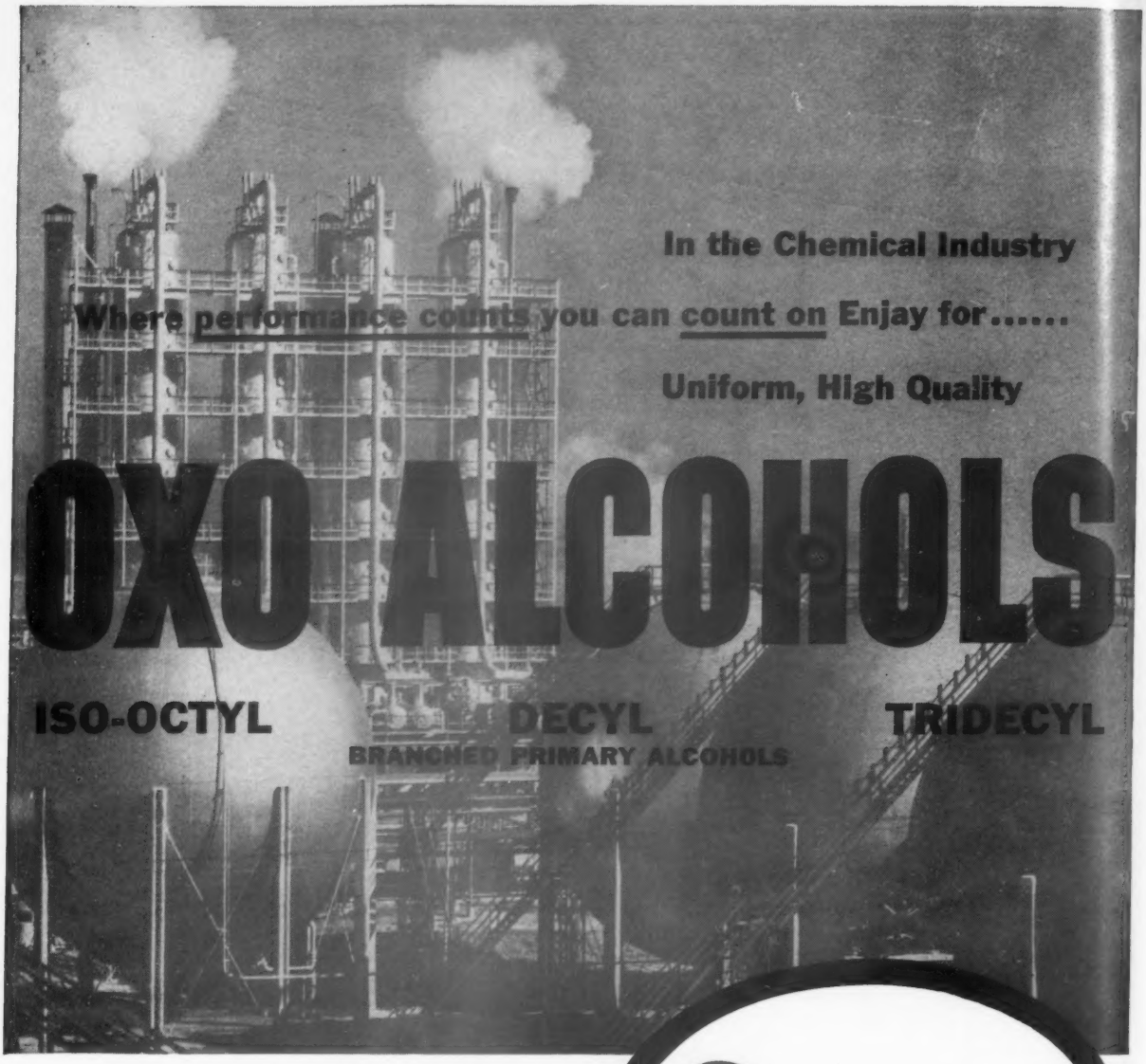

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Quality Control In The Paint Industry

PART I

FUNDAMENTAL BASIS OF STATISTICAL CONTROL

By LAWRENCE SHATKIN

LITERATURE abounds with definitions of quality control, statistical quality control, variables, and other technical terms. The science of quality control may be considered as a rather broad field bounded by each of the three concepts in the title.

Preliminary Concepts

Science implies a distinction from temperamental, empirical, or rule of thumb methods of controlling quality on the one side; and from both the fine and the applied arts on the other side. There is room for and need of judgment in the act of management which means room for personal differences. The results of a scientific procedure can be confirmed, and are free from the effect of personal differences.

Definitions

A quality characteristic is any feature of a product or process that can be measured or counted.

Control requires action for the purpose of change or (equally important) refraining from action where none is indicated.

This concept of quality control can be sold to management by showing its use as a tool or technique, which can be used to evaluate the variations in the three M's—men, machines and materials.[1] From this evaluation of variations we get capabilities, comparisons, trends and predictions which may be made to help control the quality level of any activity.

Importance Today

At not time in business history has quality been more important than it is today. Customers have become increasingly critical of the products they buy. This is especially true in a period of raw material shortages where substitutes must be used, the quality of the product and the reputation of the firm are at stake.

Quality isn't something easy to attain. It must be vigilantly pursued because of the many variables—differences in raw materials, in worker skill, in machines.

The Human Element

Of major importance to the success of any company's quality control program is the human element—the attitude of the worker at his or her bench. The worker at all times must be proud of his work and know where he fits into the manufacturing cycle. Quality must be built into the product in the first place. This can be done only by a management so quality conscious that this attitude or philosophy will filter down from top management to the worker on the production line. It was discovered that good relations must be present at the outset "if the basic statistical methods of quality control were to be put across effectively."[2]

Inspection is a post-mortem operation. It does not improve quality. It merely separates the items produced into two groups—acceptable and unacceptable, although this need not be a dichotomous action.

Functions of Quality Control

Quality control, on the other hand, attempts to prevent the manufacture of unacceptable items. It is really a three step procedure—inspection, analysis and action.[3]

It is well to look at quality control

PREFACE

Quality control is an important tool of management, and if buyer good will, so necessary in the future, is to be achieved, quality control must be consistently maintained. The paint industry has grown from a secretive, trial and error basis to a science, and the vast number of raw materials at one's disposal has increased the complexity of operations.

Correspondence between the author and many paint companies throughout the country has indicated that no definite statistical quality control program exists in the paint industry today. The companies that do have any quality control programs are the raw material manufacturers. The writer has endeavored to scratch the surface in this particular phase of management, and hopes that this small contribution will create an interest in introducing and establishing quality control in the paint industry.

The writer is especially grateful to Professor David Valinsky, and Professor H. Madeheim, seminar advisors, College of the City of New York, Graduate School of Business and Civic Administration, for their constructive criticism, suggestions and patience. Their guidance aided materially in the preparation of this thesis. To Mr. Anthony Errico, editor of Paint and Varnish Production, and Mr. E. E. Hoffman, Director of Industrial Finishes Division of the National Paint, Varnish & Lacquer Association, Inc., the author extends his deepest gratitude for answering questions and furnishing information for this thesis. The assistance of Mr. Ben Einhorn, President of Adelphi Paint and Color Works, Inc. is also gratefully acknowledged. And, finally, to my dear wife, Anita, who has shown understanding, faith and patience, and accepted this challenge to aid in my success; I say, thanks to her.

from a long-range point of view. Adequate records are important. They show whether improvement in product quality is permanent. The various methods for controlling the quality of paints from the raw material stage to the completed product will be discussed later in the series.

FUNDAMENTAL BASIS OF STATISTICAL QUALITY CONTROL

THE application of statistical techniques to problems of quality control is a development with which many of the readers may not be familiar. In the determination of quality control there are problems relating to frequency distribution and variation, control charts, and acceptance sampling. Although the control chart technique is not too complicated, most statistical techniques of design of experiments, acceptance sampling, require many hours of technical training.

A knowledge of statistical methods will be beneficial to the paint technologist in the interpretation of test data. The elements of statistical technique include:[4]

1. Collection and assembling data.
2. Classification and condensation of data.
3. Presentation of data.
4. Analysis of data.

Statistical Terms

A fundamental principle which must be understood in all statistical applications is that measurements are subject to variation. The resulting series is called a frequency distribution when data are grouped according to magnitude. This distribution is characterized by two measures, the arithmetic mean and the standard deviation.

The arithmetic mean is an average of all the observations and is computed by dividing the sum of all the observations by the number of items under consideration.

The standard deviation characterizes the extent of variation of the items in the series of observation. Specifically, it is a measure of the average amount of variation of the observation from the mean.

The formula for the arithmetic mean is $\overline{X} = \frac{\Sigma X}{N}$ where,

$\overline{X}$ signifies the arithmetic mean,

Σ = sum of all the measurements in the series,

N = number of items in the series.

The more observations that are made, the closer the calculated average is to the true or population average. The arithmetic mean has been used satisfactorily in many engineering problems.[5]

The Author

Lawrence Shatkin is assistant technical director of the Adelphi Paint and Color Works, Inc. After receiving his BA degree in chemistry from Brooklyn College, in 1946, he received a teaching assistantship at Purdue University. He was employed as a production chemist for one year with the Calco Chemical Company. During his employment with Adelphi he completed paint technology courses at New York University and received the Nuodex Award for his excellent report on anti-fouling paints. In February, 1953, he received an MBA degree in industrial management and intends to complete his PhD at New York University. He is a member of the American Chemical Society, the Society for the Advancement of Management, and the New York Paint and Varnish Production Club.

The standard deviation is computed by the equation $\sigma = \sqrt{\frac{\Sigma(X-\overline{X})^2}{N}}$ where,

σ is the symbol for the standard deviation,

$\Sigma(X-\overline{X})^2$ is the sum of the squares of the deviations of each of the observations from the mean,

N refers to the number of observations in the series, and is used to average the deviations.

Application to Paint Problems

Three types of problems may be aided by application of statistical methods. These are as follows: Presentation of data, determination of the reliability of data and quality control.

In the presentation of data, the average is easily calculated, and gives much information. The standard deviation is a measure of the precision of data.

An example will show the effectiveness of this method of presenting data. Table I presents some experimental results.

Table I
Ford Cup Viscosities in Seconds*

60.0	66.6	54.3	61.5	58.5
61.5	56.4	60.0	59.1	61.2
57.6	60.3	58.8	62.1	60.3
59.4	60.9	63.9	58.2	58.2
63.6	56.7	59.4	60.0	63.3
57.6	64.8	57.9	62.4	64.4
61.8	60.0	61.2	59.7	62.1
59.7	63.0	58.8	59.1	55.5
60.6	54.9	60.6	57.3	60.0
57.0	52.5	56.1	65.4	62.7

*Source: Special Technical Publication No. 75, Symposium on Paint and Paint Materials (1947), Published by the American Society for Testing Materials.

Although this table gives you plenty of information about the data, it is too detailed. You cannot visualize the underlying character of the distribution. A better way to present the data is to summarize the measurements by three measures, namely:

$N = 50.0$

$\overline{X} = 60.0$

$\sigma = 3.0$

With the advent of World War II, two very urgent problems arose in connection with the tremendous industrial expansion required. How was the quality to be maintained in the rush to turn out both new and old products on an unprecedented scale and how could these products be inspected without making serious inroads on the available manpower. The solution was found in the application of control charts and sampling inspection schemes.[6]

In industrial chemistry, as in nearly all scientific and engineering study, the primary objective is prediction. Of all the statistical techniques developed, control charts have had the most widespread application in industry and, even in relatively inexperienced hands, has more than justified itself under a wide variety of industrial conditions. It is essentially a test for stability and its success in industry has to some extent overshadowed its more fundamental significance as affording a basis for prediction which is essential in experimental work as well as in industry.

Control Charts

Control charts are useful statistical tools, where a large number of individual readings may be obtained. The use of control charts is part of a continuous inspection system where readings are plotted on charts as manufacture proceeds.

A control chart is a chart on which

the values of the quality characteristics being analyzed are plotted in sequence. The chart consists of a central line and two pairs of limit lines spaced above and below the central line. These are usually termed the upper and lower control limits. The distribution of the plotted values in relation to the control limits provides valuable statistical information on the quality characteristic being studied. Control charts may be plotted for many statistics, but charts for simple averages, ranges and fraction defectives are the most common. The range is the difference between the highest and lowest observations of the sample.

The variations which arise in the values of a quality characteristic may be considered as being due to causes of two main kinds:[7]

(1) *Chance causes*—These are innumerable causes, each of which exercise a small effect on the total variation. They are permissable variations which cannot be identified, either because of lack of knowledge or because such identification would be uneconomic. They are inherent in the production system and cannot be reduced or eliminated without modification in the system itself. Examples of chance causes are small variations in reaction conditions, small variations in quality of raw materials, etc.

(2) *Assignable causes*—These are causes which can be identified and which it is usually economically worth while to discover and eliminate. They arise from sudden or abnormal variation in properties of raw materials or reaction condition or from mechanical faults. In a manufacturing process they cause difficulties during production and interfere with the smooth running of the process. When they are present in a plant, the plant is not operating as efficiently as it might. Assignable causes of variation may operate during a laboratory experiment or test as well as on a plant and may vitiate the results accordingly.

The two terms are only relative, and chance causes may be assigned with the acquisition of more knowledge. The purpose of control charts is to test when variation ceases to arise solely from a constant system of chance causes and when assignable causes intervene. The indication of the presence of assignable causes may, however, be valuable as a first step in an investigation to improve a process, a method of analysis, etc. They tell an operator when to look for possible changes in a process and when not to.

This was shown very readily during the manufacture of a black color-in-oil. After loading the material in a pebble mill, and grinding for several hours, the following tests were run: (1) fineness of grind; (2) rub-up on brushing.

The grind was poor and a definite rub-up occurred when brushed out. Several factors had to be considered. Was the mill load proper? Was enough time allowed for grinding? Was the rub-up test reliable? It was determined that a change in the loading of the mill was necessary due to poor wetting of the pigment and a bodying action that took place during the manufacturing process. Secondly, the rub-up test had to be standardized so that different operators would give as nearly equal treatment as possible when brushing. This resulted in a smooth operation with no loss in mill time over previous successful runs.

The control chart is very sensitive to changes which occur between groups of observations and its success often depends on the skill with which knowledge of the process is used in deciding on the grouping to be adopted. The distance between the control limits is determined by the variation within a group and is unaffected by group to group variation.

Construction of Chart

The construction of a control chart should include: (1) Division of readings into a number of rational sub-groups or samples. (2) If standards are not available, from the sample data estimate the process average and the standard deviation which measures the inherent variation of the process. (3) Construct one chart for sample averages and another for sample ranges. Plot these values for the samples. If no points fall outside the outer control limits there is no reason to think that the data are not statistically uniform, i.e., no assignable causes of variation have intervened during the acquisition of the data. Predictions may then be safely made about the data, and other statistical techniques such as tests of significance may be employed and deductions drawn. Lines drawn at a distance of $3\sigma/\sqrt{N}$ above and below X provide the outer control limits. Experience may show that for some process these limits should be otherwise, and this will have to be left to the judgment of the user of the charts.

Purpose of Control Charts

The main purposes of control charts for batch processes are: (1) To give a clear picture of the performance of the process. (2) To indicate whether the process is under control and, if not under control, to indicate the extent of this (3) To indicate what the process is capable of doing if operated under conditions of statistical control.

It will thus be seen that the value of charts for batch processes is more suitable for long-term control and less suitable for day-to-day or hour-to-hour control as in a highly repetitive or continuous process.

Most chemical processes, however, at some stage deal with filling, packing, and weighing operations. For these operations, control charts are ideally suited, and it is thought that their introduction to many weighing operations would be well worth while, especially as a first step on plants where they have not been previously used.

A valuable application is in the testing of raw materials where the charts can be used to provide evidence in quality of the materials being supplied. From these charts compliance with specification may be judged, and it may be ascertained whether the supplier can produce to limits close enough to ensure that practically all his raw materials conform to specifications. Furthermore, control charts enable raw materials from various suppliers to be compared and the most uniform source selected for future purchases. The use of charts to check raw materials may enable a customer to draw a distinction between variation which arises from his production processes and that introduced by defective raw materials, and "trouble-hunting" may be reduced in consequence. Control charts are primarily producers' tools, however, and suppliers of raw materials should be encouraged to use control charts themselves, if these can be applied to the processes they employ.[8]

Advantages

A summary of the value of control charts and the advantages of a state of statistical control are:

(1) Test results can be clearly and concisely set out to provide information and a running commentary on production which a mass of tabulated data cannot convey.

(2) Unless production is statistically controlled, the fact that tests on small samples comply with a given specification is no proof that the remainder of the product complies with the specification. With statistically controlled production the quality of the product which will be manufactured in the future can be accurately predicted.

(3) Departures from statistically controlled production are shown up at once on a control chart, and steps can be taken to rectify the trouble so that a minimum quantity of reject material is manufactured. The supervisory staff can investigate production troubles armed with quantitative data and the knowledge of when the trouble occurred.

(4) The quality of the product can be accurately specified, and it

(*Turn to page 74*)

The Reaction Between Styrene and Unsaturated Fatty Acids*

PART I

REACTION BETWEEN STYRENE AND SORBIC ACID

By DR. S. KUT

Summary

It is shown that when sorbic acid is reacted with styrene by refluxing in xylene solution, a free radical copolymerisation of the monomers occurs simultaneously with the formation of a low molecular weight cyclic product. The latter has been identified as 3-methyl-1;2;3;6-tetrahydrodiphenyl-6-carboxylic acid formed by Diels-Alder addition. It is suggested that the copolymerization of these two monomers proceeds through a 1;4 addition of the styrene to the conjugated (diene) system of the sorbic acid. To account for the formation of only one of the two possible Diels-Alder adducts polar attraction between the reactants, is suggested.

THE work described in this article was carried out as part of an investigation into the formation and structure of 'styrenated drying oils'. These new products have attracted considerable interest and gained some importance in the paint industry as useful surface coating materials. Wakeford, Hewitt and Armitage (1946) were the first to report the successful incorporation of styrene into drying oils by heating the styrene and drying oil (or alkyd resin) in a solvent (the 'solvent method'), the latter controlling the molecular weight of the reaction products so as to yield homogeneous products. Later, the Dow Chemical Co. (1948) and Peterson (1948), reported the reaction between styrene and drying oils in the absence of solvents (i.e. the 'solventless method'), homogeneous products being obtained by the use of α-methyl styrene as moderator.

Various suggestions (Hewitt & Armitage, 1946; Rinse & Korf, 1949; Brunner & Tucker, 1949; Rinse, 1950; Powers, 1950; Petit & Fournier, 1950) have been made to account for the formation and structure of these products, but no reliable experimental evidence has yet been presented. (For a fuller discussion see Kut, 1951, & *Paint Technology 1952*, March to July).

Styrene and Sorbic Acid Reaction

Due to the complex and varying nature of the drying oils it is possible to carry out satisfactory experiments on their reactions and the tendency in recent years has been to study the reactions (such as their polymerisation and autoxidation) of the pure long chain fatty acids and simpler related compounds rather than of the oils themselves.

In this study it was also considered that a knowledge of any reaction occurring between a simple conjugated acid, such as sorbic acid, and styrene would greatly assist in elucidating the mechanism of reaction between styrene and the more complex conjugated drying oil fatty acids, such as elaeostearic acid. The study of sorbic acid as the simplest analogue of elaeostearic acid has, for example, thrown much light on the polymerisation of elaeostearic acid (Farmer & Morrison-Jones, 1940; Bradley, 1947). The reaction was carried out by refluxing sorbic acid (1 part), styrene (1 part) and xylene (2 parts) under three conditions: (a) in presence of nitrogen, (b) in presence of air and (c) in presence of air and the initial addition of 0.5% benzoyl peroxide catalyst (calculated on the styrene content).

During the first 20 hours crystallisation occured on cooling the clear hot solutions, and heating was continued until little or no monomeric styrene was left in the reaction mixtures. (This was determined from the solids figures.) The products were clear, bright, yellow viscous solutions, some of whose solubility characteristics were different from those of styrenated drying oil fatty acids. For example, on the addition of benzene or xylene, a yellow flocculent precipitate, remaining insoluble on boiling, was thrown down. On the other hand, they were miscible with alcohol in all proportions. These properties are obviously due to the different solubility characteristics of sorbic acid as compared to drying oil fatty acids.

The scheme of analysis was as follows. To the reaction product excess benzene was added and the precipitate fraction (1) separated. The benzene solution was then extracted with aqueous potassium hydroxide, the benzene and aqueous solutions acidified, and the latter extracted with ether. This yielded the benzene soluble fraction (2) and the ether extract (fraction 3). The latter was extracted with light petroleum (40/60) to yield a soluble fraction (5) and insoluble fraction (4). By benzene extraction of (4), insoluble fraction (6) and soluble fraction (7)

*From a Ph. D. thesis, 1951, University of London London, England, by S. Kut.

were obtained. The results are summarized in Table 1. It will be noted that all the constants were determined only on the more important fractions (e.g. fraction (3) was only intermediate, and fractions (6) and (7) were isolated only to demonstrate the presence of different molecular weight fractions). In addition, the products were of zero diene value and no free sorbic acid could be detected.

Molecular weights were determined by the Rast camphor method, which for the higher molecular weight fractions can be considered as only indicating the order of the molecular weight. Iodine values were determined by the Wijs method as developed by Mikusch and Frazier (1941,1943). These authors using 0.4N iodine-bromide in glacial acetic acid in 650-800% excess at 0°C for a reaction period of one to three hours, found that theoretical results could be readily obtained for conjugated oils and fatty acids. Its applicability to sorbic acid was tested, determining the halogen absorption after 2-5 hours, with results given in Table 2.

The determined iodine value is seen to have been somewhat over half the theoretical value, the second double bond having only partially reacted. This is in accord with the general behaviour of unsaturated acids containing a carboxyl group attached to an unsaturated carbon atom, little or no halogen addition occurring at this adjacent double bond (Markley, 1947). Reaction has been found to be incomplete for such acids, even after very extended reaction times.

Though Woburn iodine procedure does not give theoretical results for sorbic acid, this does not imply that iodine values on the products would be of no value. If the iodine values indicated the presence of only one double bond, other data could confirm this while a conjugated system would give a reading corresponding to more than one double bond. These considerations showed that the determination of the iodine values would be useful.

All the fractions described in Table 1 were resinous solids with the exception of fraction 5, which was a viscous liquid. Since polystyrene is soluble in benezene, the precipitation of part of the reaction product by benzene indicated that a reaction occurred between styrene and sorbic acid. This fraction (1) clearly represented high molecular weight copolymers of styrene and sorbic acid. The benzene soluble fractions were extracted with aqueous alkali to separate the remaining acidic products of reaction. The residual benzene soluble fraction (2) therefore represented free polystyrene (retaining a very small residual quantity of acid products). As seen from Table 1, the amount of polystyrene formed was of a small order. Since the reaction conditions used were also suitable for the self-polymerisation of styrene to polystyrene, it was to be expected that some polystyrene would be formed.

Fraction 3 was then separated by petroleum ether into fraction 4 and 5. Fraction 4 consisted of lower molecular weight copolymers and could be fractionated with benzene to yield benzene soluble and insoluble copolymers (separate experiments showed that the presence of fraction 5 greatly promoted the solubility in benzene of otherwise insoluble copolymers).

Attention must now be directed to fraction 5, the petroleum ether soluble fraction. In Table 3 are summarized the analytical constants obtained for this fraction in the three experiments a), b), and c).

The last column marked "Theoretical" gives the figures calculated for an addition product formed, from one molecule of styrene and one molecule of sorbic acid with the elimination of one double bond. As seen from Table 3 the found and calculated figures agree fairly closely, especially bearing in mind that these constants were determined on the fractions as isolated

Table 1

Experiment		Fractions 1	2	3	4	5	6	7
	% of solids	28.0	4.2	67.9	18.5	49.4	9.2	9.3
	Equivalent	295	1990	221.5	—	207	344	293
	Iodine Value	71.6	—	—	—	—	—	—
a	%C	—	—	—	—	76.74	—	—
	%H	—	—	—	—	7.55	—	—
	Molec. Weight	1350	—	—	—	—	—	—
	% of solids	36.1	2.6	61.4	17.3	44.1	13.6	3.7
	Equivalent	299	3250	223	—	208	293	311
	Iodine Value	72.9	—	—	—	115.7	64.9	71.9
b	%C	80.17	—	—	—	75.53	—	—
	%H	7.66	—	—	—	7.52	—	—
	Molec. Weight	1450	—	—	—	205	—	430
	% of solids	43.4	3.1	53.5	15.1	38.3	9.7	54
	Equivalent	263	2930	212.1	—	205	264	259
	Iodine Value	83.0	—	—	—	119.5	—	—
c	%C	—	—	—	—	76.65	—	—
	%H	—	—	—	—	7.72	—	—
	Molec. Weight	1300	—	—	—	—	—	—

Table 2

Iodine Value of Sorbic Acid by the Woburn Method.

Time of reaction (hours) at 0°C.	Observed iodine value
2	235.9 gm. 1/100 gm.
3	247.7
4	259.5
5	259.5

Theoretical Iodine Value: 453.3

Table 3

	5a	5b	5c	Theoretical
Equivalent	206.5	208.2	204.4	216
Iodine Value		115.7	119.5	117.5
Hydrogenation Value	117.1			117.5
%C	76.74	75.53	76.65	77.76
%H	7.55	7.52	7.72	7.41
Molec. Weight		205		216
Refractive Index (20°C)			1.5382	

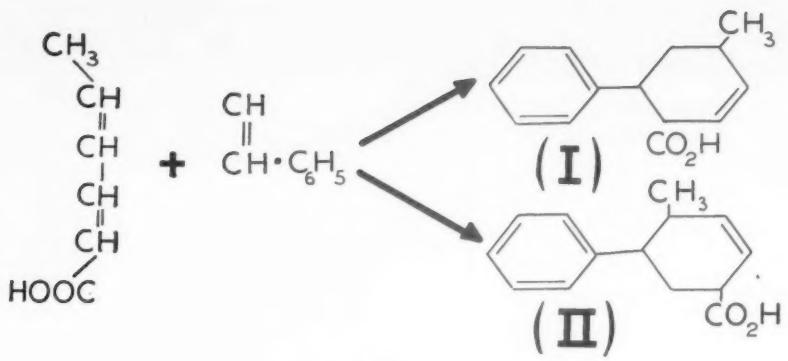


Figure 1

directly from the reaction products without further purification. Further confirmation of fraction 5 being such a 1 : 1 addition product was obtained from the C/H values of the hydrogenated product:

	%C	%H
Found	76.85	8.20
Calculated	77.05	8.26

Structure of 1 : 1 Product

The most likely structure of this compound appeared to be one formed by terminal addition of the styrene vinyl group to the butadiene system in sorbic acid. Addition could occur in two ways, leading to (I) or (II) or both (see figure I)

(I) and (II) are hydrogenated diphenyls, and should yield methyl-diphenyls on dehydrogenation, as carboxyl groups are generally eliminated. Dehydrogenation with selenium proceeded smoothly at 310°C (±2°). The product was extracted with ether from the residual selenium, and the extract washed with aqueous potassium hydroxide to remove acidic products.

The aqueous solution was acidified and extraction with ether yielded a small amount of acid. (*Acid fraction*) Hydrocarbon (*non-acidic*) *fraction*. After distilling off the ether, a light yellow liquid was obtained, the physical constants of which corresponded to those of 3-methyl-diphenyl. It was identified as such by neutral potassium permanganate oxidation which yielded diphenyl-3-carboxylic acid. That this latter acid was a carboxylic acid of diphenyl was confirmed by micro-distillation of its calcium salt which yielded diphenyl. The 1: 1 addition product of sorbic acid and styrene (fraction 5) is therefore 3-methyl—1,2,3,6-tetrahydro-diphenyl-6-carboxylic acid (I) formed by a Diels-Alder addition. The absence of a second oxidation product indicated the formation of only the one possible addition product. Such a partially hydrogenated diphenyl would give theoretical iodine values, as in fact obtained.

The acid fraction from the dehydrogenation was a small amount of dark brown solid of equivalent 231.5. After rigorous purification it was obtained as fine colourless needles.

Melting point: 223.5-225.5°C (uncorrected).

(Found: C: 79.12% ; H: 5.76%.)

This acid was probably the dehydrogenated, non-decarboxylated Diels-Alder addition product, that is 3-methyl-diphenyl-6-carboxylic acid, $C_{14}H_{12}O_2$. The calculated C/H values for $C_{14}H_{12}O_2$ agree well with those found: 79.24%; H: 5.66%. Further its theoretical equivalent is 212, which is of the same order as was found on the impure acid.

Loss of Acidity

On determining the mean acid value of products a), b), and c) as calculated from their analysis, it was apparent that a loss of acidity had occurred during the reaction. The calculated mean acid values of the non-solvent products were: a—225.7 mgms. KOH/gm; b—222.1; c—234.4. The theoretical value for equal weights of sorbic acid and styrene was 250 mgms. KOH/gm. If some monomeric styrene was lost during refluxing this figure would have been higher. Such a loss of acidity was confirmed by refluxing the reactants in air (i.e. as in experiment b) and weighing the flask and contents before and after completion of the reaction. 8.2% of the reaction mixture was found to have been lost during the long period of reflux. The acid value of the reaction product was 119.6 mgms KOH/gm., whereas the theoretical value for a product of 1 part styrene, 1 part sorbic acid (acid value 500) and 2 parts xylene and/or styrene, the acid value should have increased to 135.2. This indicated a loss of carboxyl groups during the reaction and also showed the loss of acidity not to have been due to xylene molecules having joined copolymer molecules by chain transfer. The observed value of 119.6 therefore showed a loss of acidity of 11.5% during the reaction. Calculation from the acid values of the fractions isolated from this reaction product b yielded a similar figure of 11.2%.

An experiment was carried out to determine whether this loss of acidity during the reaction was due to the evolution of carbon dioxide during the reaction. Carbon dioxide free air entered the reaction flask just above the surface of the refluxing mixture, and the gaseous products were periodically swept into a carbon dioxide absorption train fitted to the top of the double surface condenser used. Provision (sulphuric acid and paraffin chips) was made for the removal of any solvent vapours carried over. The reaction was carried out in air rather than in nitrogen, due to the faster reaction in air. The purified air was not passed continously, but only periodically, since otherwise solvent vapour would have been continously swept out from the reaction mixture.

Carbon dioxide was in fact collected, but accounted for only an acid value of 3.6 mgms. KOH per gm. of non-solvent styrene-sorbic acid product. Since 28 mgms. KOH per gm. were lost in experiment the percentage loss in acidity accounted for as due to decarboxylation was therefore 12.7%

It is not possible to fully explain this loss in acidity, but since the latter is small it can no doubt be considered as a side reaction. Whether this loss of free carboxyl groups occurs prior to, or after copolymerisation should make no difference to the reactivity of the product, the diene structure being presumably still intact, since complete decarboxylation would yield methyl butadiene.

Initial Product

It has already been noted that on refluxing styrene and sorbic acid in xylene, a clear solution is obtained at the boiling point from which, on cooling during the first 20 hours, crystallisation takes place. It was likely that this was due to crystallisation of sorbic acid. To confirm this the reactants (in the standard ratio of 1 : 1 : 2) were refluxed for 6 hours in air when analysis indicated the presence of about 30% free sorbic acid.

The isolation and characterisation of the various reaction products show that under the conditions of reaction styrene copolymerises with sorbic acid.

Mechanism of the Reaction

A very important part of the experimental work was the isolation and characterisation of the simple 1 : 4 Diels-Alder adduct formed between styrene and sorbic acid, only one of the two possible adducts being produced.

On the basis of the isolation of this 1 : 1 Diels-Alder adduct formed and of the characteristics of the copolymers

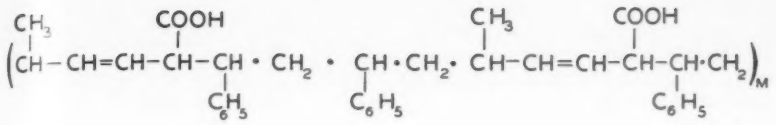


Figure 2

it is suggested that the copolymerization of styrene with sorbic acid proceeds by 1 : 4 addition of styrene to the conjugated system of the acid forming products shown in Figure 2

The equivalents of the copolymers indicate packed styrene chains, which are shown head to tail, as they are arranged in polystyrene. The styrene in the copolymers would probably add predominantly to the sorbic acid in the same manner as in the 1 : 1 compound. The results of the sorbic acid—styrene reaction in the presence of air, benzoyl peroxide and nitrogen, and the isolation of copolymer fractions differing in molecular weight and solubility, showed the copolymerisation to be of the normal free radical type. Thus the percentages of copolymers la, 1b and 1c were in the following order:

$$Bz_2O_2 > O_2 > N_2$$

This is as expected, the benzoyl peroxide being the most active catalyst, (also there is an oxygen catalysis superimposed on the peroxide one), oxygen less active, or less accessible to the reaction mixture, since in the reaction under nitrogen no catalyst was present. The yields of Diels-Alder adducts, Bz_2O_2 O_2 N_2, are exactly as expected, the proportion of Diels-Alder 1 : 1 addition being greater the less tendency there is for copolymerisation, which is promoted by the presence of a catalyst.

The catalytic effect of benzoyl peroxide in polymerisation and copolymerisation reactions is well known, and it is also now recognized that air or oxygen act as a polymerisation and copolymerisation catalyst at elevated temperatures (Bawn, 1948). Nitrogen molecules, on the other hand, have been shown to have no specific effect on the course of the polymerisation of styrene (Menary, Ubbelohde & Wright, 1948).

Aeternation of the monomers in copolymers (as shown) is now well established to be a general feature of the structure of copolymers (Mayo & Walling, 1950). Some 1 : 2 addition, (see figure 3) may also take place (X representing the remaining portion of the copolymer molecule).

In support of the suggested structures and mechanism of copolymerisation, many examples may be quoted from analagous polymerisations of conjugated dienes, where, depending on the reaction conditions, Diels-Alder adducts are formed simultaneously to polymers (Lebedev, 1913; Lebedev & Serjienko, 1935; Bradley, 1947). (For a fuller discussion, see Kut, 1951.) Analogies may also be drawn with similar copolymerisation reactions, of which reference need only be made to the styrene-butadiene reaction. Many studies of this reaction (Burke & Grummit, 1949) have shown it to occur by 1,4 and 1,2 addition (the proportion of each depending on the reaction conditions) of the monomer to the conjugated diene system, the copolymer being by no means regular.

The catalytic effects observed and the mechanism of copolymerisation suggested for the reaction between styrene and sorbic acid therefore fit into the general framework of present knowledge of polymerisations and copolymerisations.

Table 4

Sorbic acid—styrene copolymers: Iodine Values

Woburn Method (0.4N; 5 hours reaction at 0°C).

Fraction	Observed Iodine Value	Theoretical
1b	72.9	84.8
7b	71.9	81.7
1c	83.0	96.3
1a	71.6	85.9

Of importance to the styrene-conjugated acid reaction under discussion is the work of Alder and Rickert (1938). These authors reacted styrene with dienes while repressing polymerisation processes by employing (0.5% of the reaction mixture) of acetylene-dicarboxylic acid. Butadiene, 2-3 dimethylbutadiene and cyclopentadiene on heating with styrene at 170-190°C, yielded amongst other products (such as dimeric butadienes) 4-phenylcyclohexene, 1,2, dimethyl-4-phenylcyclohexene and 3, 6-endomethylene-4-phenylcyclohexene respectively. These are all formed by the terminal addition of styrene to the conjugated systems, and are quite analagous to the Diels-Alder adduct iso ated in this study.

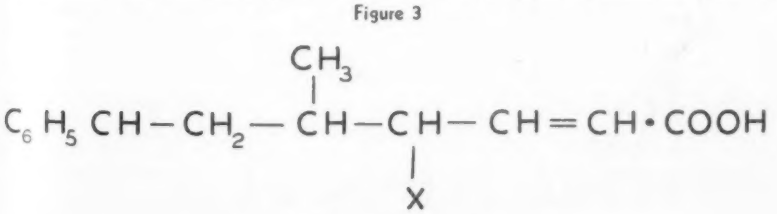
These latter reactions have also shown styrene to act as a normal dienophile. That sorbic acid reacts as a normal diene is shown by it reacting with maleic anhydride (Diels & Alder, 1929), and by the nature of its polymerisation. Other instances of sorbic acid in the diene synthesis have been reported by Rigg and Rosenthal (1949) and by Wagner and Helmert (1938).

Lastly, reference should be made to one other conceivable reaction mechanism, namely styrene acting as a conjugated system, conjugation taking place between the aromatic nucleus and the unsaturated side chain. A number of reactions are recorded in the literature of an aromatic system acting as conjugated with its side chain (Gilman, Kirby & Kinney, 1929; Gilman & Kirby, 1933; Hoffmann, 1933; Kohler & Nygaard, 1930). In these cases, however, steric factors or forced reaction conditions are responsible. This type of reaction, in which polymerisation involving the side—chain—ring conjugated system would occur, has not been shown to take place with styrene, polymerisation occurring solely through the olefin bonds. In view of these considerations, the claim of Tamayo and Viguerra (1941 & 1942) to have obtained a 1,4 addition product of maleic anhydride with α-methyl styrene seems conflicting. The proof of the supposed hydronaphthalene structure that would be formed, was based on alkaline oxidation. No condensation occurred with .-methyl styrene, whilst with styrene and maleic anhydride, they claimed the formation of a 1 : 1α, β addition product.

Hudson and Robinson (1941) on the other hand, state that there does not appear to be any recorded instance of a simple Diels-Alder adduct (1 : 1) being formed by o -β(1 : 4) addition to styrene, or one of its substituted derivatives. This is in accordance with the results obtained in the present work.

Following this general discussion on the suggested mechanism of copolymerisation, it is now necessary to refer

Figure 3



to some of the experimental results in more detail.

Copolymers

Iodine Values. In Table 4 the observed and calculated iodine values for the copolymers are given (calculated from the equivalants, and based on 1:4 addition).

As seen from Table 4 the observed and calculated values are of the same order, though the latter is always higher. The conjugated sorbic acid system did not fully react with the iodine reagent, these figures, together with the zero diene values and the other data, may be taken as proving addition of styrene to the conjugated acid with the saturation of one double bond. Since a loss of carboxyl groups occurred during the reaction the theoretical iodine values (calculated from the equivalants) should be a little higher, though the same order would still be maintained. It is possible that longer reaction periods are desirable, and factors discussed in Part (III) for the elaeostearic acid copolymers may also come into consideration.

Mutual solubility. The effect of the presence of the Diels-Alder adduct in promoting the solubility of the sorbic acid—styrene copolymers in benzene has been previously referred to. Similarly, this explaines the initial incompatible films observed in some drying oil (not with the triply conjugated wood and oiticica oils)—styrene reactions, where the films gradually become more compatible as the reaction proceeds. If in those cases a large proportion of 1 : 1 adduct forms more slowly than the copolymer, the increasing film compatibility as the reaction proceeded could be expected.

Polar Effects

To account for the formation of (I) rather than (II) it is suggested that polar influences are favorable. In considering this possibility, it is first necessary to examine the charge distribution on sorbic acid and on the vinyl group of styrene.

According to the charge distribution on double bonds assigned by Price (1946), the carbon atoms in sorbic acid should have charges as indicated in Figure 4.

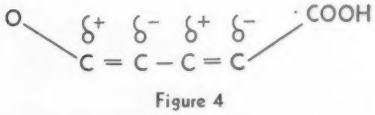


Figure 4

Heinanen (1938) also predicted the same charge distribution on the ethyl sorbate molecule.

Evidence for the direction of polarisation of the styrene vinyl group may be summarised as follows: (1) Otto and Wenzke (1935) found styrene to have a small moment of about 0.17-0.37D, the moment being opposite in direction to that in toluene. (2) Torkington (1949), from a study of the infra-red spectrum of styrene, concluded that it has a resultant negative charge on the terminal carbon atom as shown in Figure 5. (3) The above polarisation

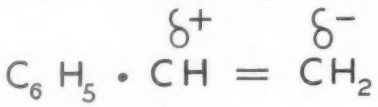


Figure 5

of styrene is confirmed by its addition reactions, as for example, with HOBr (Read 'Reid, 1928, 1930); IC1 (Ingold & Smith, 1931) and HC1 (Schramm, 1893; French Patent, 1932; 1933). It is now suggested that due to these polarisations of styrene and sorbic acid compound I is formed, as indicated in Figure 6.

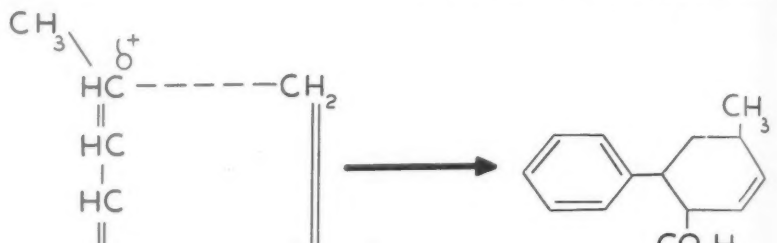


Figure 6

According to Day (1950) in most cases, it is the activated double bond of the dienophile which initiates the reaction, since, when it is not activated, addition occurs less readily or not at all. Since the vinyl group of styrene is polarised relatively weakly, this may account for the observed slow formation of the 1 : 1 adduct. Rigg and Rosenthal (1949) similarly obtained only one Diels-Alder adduct III from ethyl sorbate and methyl acrylate, see figure 7. Its formation can be represented similarly to that of the sorbic acid-styrene adduct, polar effects again causing the formation of only the one adduct.

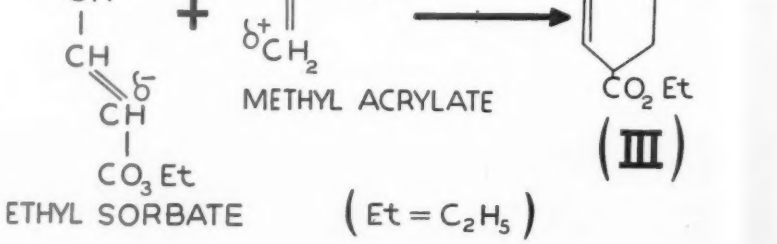
In the reaction studied in this paper, ring formation accompanied the copolymerisation, due to the favourable temperature, and absence of sufficient catalyst to cause a more rapid copolymerisation. The formation of the simple 1 : 1 Diels-Alder adduct can be envisaged on the mechanisms generally suggested for this reaction (Klootzel 1948), the orientation being as observed since it takes advantage of the electrostatic attractive forces.

Polarity and Copolymerisation. From recent work it appears that polarity also plays an important part in copolymerisation. In particular Price (1946), Razumovski (1948), Mayo and Walling (1950) and Mark (1950) have drawn attention to this effect, and on the basis of this work it would appear likely that the styrene and sorbic acid are linked through the same atoms in the copolymer as in the Diels-Alder adduct.

Experimental

Reagents and Experimental Conditions: Pure sorbic acid and xylene. In experiments a) and b) monomeric styrene containing 10 parts/million of p-tertiary butyl-catechol as inhibitor was used. For experiment c) the styrene was distilled directly before use from 1-2% sulphur, collecting the constant

Figure 7



boiling fraction at 145.5°C. In general 50 gm. sorbic acid, 50 gm. styrene and 100 gm. xylene were refluxed. In experiment c) 0.25 gm. benzoyl peroxide (0.5% on the styrene) was added to the reaction mixture before heating was commenced, and no further addition of benzoyl peroxide was made. In experiments b) and c) the reactants were refluxed in air. In experiment a) purified nitrogen was bubbled through the reaction mixture, and the latter was constantly under an atmosphere of nitrogen. The viscosities (25°C; Gardner—Holt) of the reaction products were: a) 7 poises; b) 13 poises; c) 27 poises.

Analysis: Only analytical grade reagents were employed. All the determinations were carried out quantitatively. In the benzene water extractions, several re-extractions were made. The acidified fractions were washed free of mineral acid, and the washings re-extracted. After drying over sodium sulphate, the latter was washed free of all the extract.

None of the isolated fractions in experiments a), b) and c) indicated the presence of free sorbic acid. The absence of free sorbic acid in fractions 1 was confirmed by boiling the copolymers with water and filtering hot. The filtrates were neutral indicating the absence of free unreacted sorbic acid.

Iodine Values: These were determined by reacting with Woburn (O.4N) iodine-bromide reagent at O°C for 5 hours.

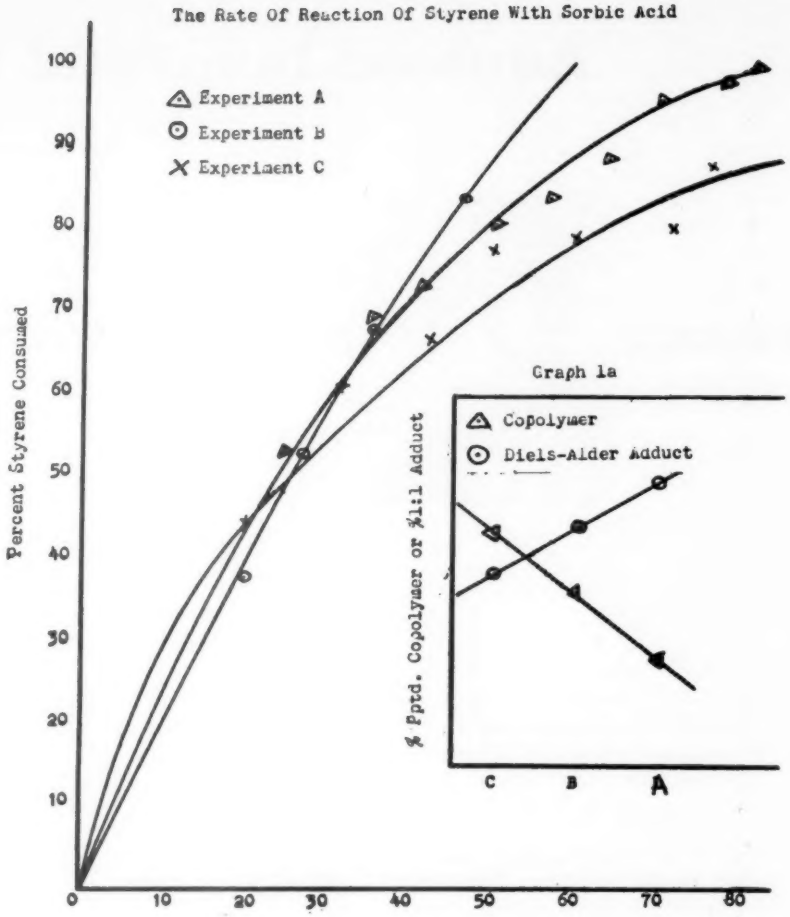
Diene Values: The Ellis-Jones (1936) procedure was used, employing 1 : 1-acetone-toluene and a longer period of reflux for products insoluble in toluene.

Hydrogenation Values: These were carried out in an all glass apparatus, using a flexible glass coil to connect the reaction flask and manometer. Adams catalyst (PtO_2, H_2O) was used. The sorbic acid readily yielded theoretical values using glacial acetic acid as solvent (0.1 gm sample and 0.02 gm catalyst). In order to hydrogenate the Diels-Alder adduct, a 1 : 1 mixture of ethyl acetate and glacial acetic acid (0.3-0.4gm sample and 0.02gm catalyst) was found most suitable. The hydrogenated product was sticky immobile liquid.

The analytical constants for the various fractions are detailed in Table 1. The theoretical solids in each experiment should have been 50%, but were greater as calculated from the isolated fractions due to loss of some solvent during the prolonged period of reflux. The discrepancy was least in experiment c) were (according to the solids figure which is only approximate) only 88% of the styrene was consumed at the end of the experiment (after 82 hours reaction) whereas, in experiments a) (after 81 hours) and b) (54 hours reaction) all the monomeric styrene had reacted

GRAPH 1

The Rate Of Reaction Of Styrene With Sorbic Acid



Identification of Adduct

The Diels-Alder adduct (6.4 gms) was dehydrogenated by heating with an equal quantity of selenium at 310 ± 2°C for 22½ hours, when no further hydrogen selenide was involved, following the procedure as described by Diels (1927). The reaction product was agitated with ether, filtered and the ether solution extracted with aq.potasssium hydroxide, in case decarboxylation was incomplete. The aq. extract yielded 0.42gm of a dark brown solid.

The ether extract yielded after washing with water and drying, 4 gm. of a dark black liquid. By agitating with charcoal in ether solution a light yellow liquid, clearly not entirely pure, was obtained. Its constants were determined:

Molecular weight (Rast): 173 (calculated for methyl diphenyl: 168); refractive index (20°C); 1.5915 (value for 3-methyl diphenyl: 1.5916). Found: C: 91.31%; H: 7.94%.

Calculated for $C_{13}H_{12}$: C: 92.85%; H: 7.14%.

In view of the impurity of the sample the C/H values were in not very good agreement with the calculated figures.

Oxidation

The 3-methyl-diphenyl was stirred with a slight excess of 3% neutral potassium permanganate on a steam bath. The precipitated manganese dioxide was filtered off and the oxidation product isolated from the filtrate as a solid acid, equivalent 205 (calculated 198). The acid crystallised as colourless glistening plates from alcohol-water but persisted in retaining a bright yellow colour after filtration. M.P. 163-165°C (M.p. of diphenyl-3-carboxylic acid: 160-162°; 166°, the other diphenyl carboxylic acids having very different m.ps.) molecular weight (Rast): 193 (calculated for $C_{13}H_{10}O_2$: 198) Found C: 77.41%; H: 5.03%. Cal-

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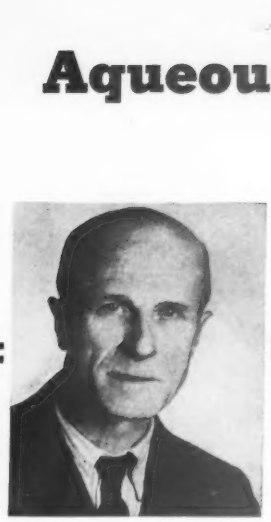
Aqueous Industrial Enamels



A NEW TECHNOLOGY IN BAKED FINISHES

By Dr. HERBERT HOENEL*

SURFACE coating materials for industrial applications usually contain relatively large quantities of organic solvents, amounting frequently to more than 50% of the vehicle. For economic reasons, attempts have been made to save solvent by hot-spraying or by means of solvent-recovery, processes which involve high capital costs. Even when relatively cheap organic solvents are available, it is still worthwhile to curtail or eliminate them in order to avoid the toxicity hazard and the risk of fire and explosion, which their use entails.

Towards the end of the war, when it was vital to economize in the use of raw materials, I attempted to employ water as a solvent in vehicles for the coating of metallic surfaces. I held the opinion, and this may be open to criticism, that the resin base should be dissolved in the aqueous phase, precisely as it would be in an organic solvent, in order to yield a completely continuous film. I realized, of course, that such a film should also be completely water-resistant and as weather-proof as possible. It should protect the coated object against corrosion and it should be resistant to oils and solvents; furthermore, it should be sufficiently flexible to allow deep pressing. In short, it should possess all the properties normally expected of surface coatings for metals.

At this time I had already obtained some promising results which had found certain practical applications. My work was interrupted many times, and I confess that I sometimes became very discouraged, but, nevertheless, I returned always to this problem.

Many of you may have read the very interesting paper by Professor Brintzinger (1) outlining the work that he has done on this problem. My application to the problem is, however, different from Professor Brintzinger's, and I consider my solution to be simpler and possibly more economical. It has been based on experience and the knowledge gained from many years of practical investigation.

Many of you will appreciate that one good idea is not always in itself sufficient to achieve practical success. Unpleasant surprises occur frequently, and, in order to overcome such difficulties, further inventive steps are necessary before a really good formula can be established and a basic principle made to produce results.

Supplementing my experimental work, for a year and a half a number of laboratory technicians, under the efficient direction of Fritz Heidkamp and M. Ulmer, worked on the application of a series of products manufactured according to my formulae.

This experimental work, which proved my compositions to yield exceptionally good results when tested in every conceivable way, appears to justify their manufacture on a large scale and their introduction for industrial use. Today I have the pleasure of talking to you about the progress which has been made up to the present time.

The lacquers and enamels normally used for the coating of metallic surfaces, including those which require stamping after coating, are usually baked at elevated temperatures to effect complete cure. The necessary equipment for such baking is generally already installed. I consider this fact a fortunate circumstance, since otherwise my problem to develop water-soluble industrial finishes could hardly have been successfully solved.

Baking Vehicles

Before describing the manner in which I have tackled this problem and the practical results I have obtained, I would like to give you

*Dr. Herbert Hoenel, of Graz, Austria, is a member of the international research staff of Reichhold Chemicals, Inc.

a short history of the development of baking vehicles. This history will, of course, be incomplete, as I intend to mention only those methods and products still in current use. I will, however, deal particularly with those processes which have in some way contributed to the development of my water-soluble resins, and I ask your indulgence when I sometimes use terms which are intended to be understood also by persons with no chemical background.

The early products used in baked finishes for metal cans and tubes were probably based on stand oils. These were succeeded by the gold lacquers based on Copal varnishes, which furnished much harder films, and they, in turn, were followed by varnishes based on modified phenolic resins, which later might be better described as phenol-modified natural resins. For applications requiring very light-colored films after baking, the so-called silver lacquers containing maleic resins instead of phenolic resins are used. Where color is unimportant, or if very dark results are desired, combinations of drying oils with asphalt, instead of a hard resin, or a hard resin with stearin pitch, instead of a drying oil, may be used.

To my knowledge it is just 25 years since the first baking vehicle containing an alkyd resin as the only film-forming material was developed, such resins having been used earlier only in combination with nitrocellulose. For baking vehicles of this kind, short-oil alkyds, consisting of drying-oil-modified glyceryl phthalate esters (2) were used. Short-oil alkyds were employed for this purpose before the long-oil types were introduced for use in paints and enamels for application by brushing. This reversed development is perhaps typical of the U.S.A., in which country the phthalic resins originated.

In all cases mentioned so far, baking was employed to accelerate the drying of the oil vehicle, whether the oil was present as such or, particularly as in alkyd resins, it was bound chemically. Thus, the hardening process in these cases actually depends upon oxidation and polymerization reactions. In some cases, e.g. when relatively high acidic Copal—or alkyd-varnishes are used, a limited amount of condensation, that is to say esterification, may also take place.

In 1907 Baekeland (3) conceived the idea of using thermo-hardening phenolic resins as a base for baking varnishes. Although Baekeland believed that the hardening of these phenolic resins depends upon a polymerization process, we know today (4) that the formation of macro-molecules (the mechanism of hardening) is due mainly to condensation, as indicated by the formation of water.

The "Bakelite" varnish of Baekeland was probably the first baking vehicle which hardened essentially by condensation. Although such vehicles have not been used to any great extent, today they are still used in a few cases due to the extreme hardness and resistance of the finished coating (5). In most cases, however, they are unsuitable because of their poor elasticity and adhesion after curing. No doubt a great deal of experimentation has been carried out in order to improve these properties, but it has been unsuccessful. It would surpass the scope of my paper to name all the pertaining literature.(6)

After a considerable lapse of time, work on this problem gained new impetus when I successfully effected a synthesis between phenoplasts, which in application became too hard, and the oil-containing vehicle, which by itself remained too soft, by means of alkyl phenol resins. In the curing of films containing such alkyl phenol resins, condensation and polymerization processes occur side by side. (7)

Alkyl-Phenol Reaction

The designation "alkyl-phenol resins" which, incidentally, was not coined by me, tells very little about the properties of these materials. By alkyl-phenol resins we mean, generally speaking, resins derived from phenols which contain medium-sized alkyl, aralkyl or aryl groups in a reactive position (o-, o'- or p- to the phenolic hydroxyl group), and therefore, the reaction products of these phenols with an excess of formaldehyde are somewhat restricted in their capacity for macro-molecule formation. Such resins, as I have stated earlier (8), are hardenable but not truly thermosetting, and only in combination with a properly chosen proportion of a drying oil, more particularly a stand oil, do they become truly thermosetting.

I have always been of the opinion (9) that alkyl-phenol resins react chemically with the oil component, particularly if the oil contains conjugated double bonds. This opinion, based on various indications, has been doubted by most of my colleagues, but now has been proved more particularly by the very instructive work of K. Hultzsch (10) and A. Greth (11), who have furnished a comprehensive explanation of the reaction in which the intermediately formed methylene quinones eventually furnish adducts containing chroman linkages.

If a suitable mixture of an alkyl-phenol resin and an oil is made to undergo reaction after application, i.e. in the film (9) itself, remarkably hard and elastic films are obtained. Outstanding results are achieved if, instead of an oil, an alkyd resin, preferably based on dehydrated castor oil, is employed. The reason why this formulation has not been more widely used may possibly be found in the relatively high cost of the alkyl-phenol resins, coupled with the fact that they have not been extensively promoted for this application. Furthermore, the long baking times and high temperatures required for curing have discouraged the use of this formulation. Many people think that if it is essential to bake at a temperature as high as 180°C, the resulting film should possess not only very good hardness, but also special properties such as gasoline resistance, a requirement which had been much in demand for a considerable time. Only at a much later date have alkyl phenols been used to a considerable extent, namely as an essential ingredient for wire enamels and other varnishes in the electric field. Some of the alkyl phenols have been used by the varnish makers in combination with other materials or marketed as synthetic plasticized combinations. (12)

Commercial alkyl-phenol resins, which are designed to serve a variety of purposes, do not have the maximum capacity for hardening which could be conferred upon them, despite the blockage of part

of their reaction-favorable positions. Beyond this intrinsic maximum the hardening capacity can be considerably increased by co-employing phenols without blocking substituents; this can be achieved without interfering with the homogeneity of the resin/oil combination in the course of the mutual reaction. (13) I found in later work that very reactive alkyl phenols with unblocked *ortho-* and *para*-positions were still able to furnish homogenous interaction products with drying oils, if such phenols carry in one of the *meta*-positions a relatively large alkyl group, for example C_5 or higher, or if both *meta*-positions are occupied and at least one of the substituents is C_3 or higher. (14) Also, this possibility has been technically exploited to a considerable extent. (15)

Internal Plasticization

Instead of starting from alkyl phenols, that is to say, phenols already possessing hydrocarbon groups attached directly to the phenolic nucleus, comparable substituents, such as an alkoxy-methyl group, may be introduced indirectly into the reactive positions of the phenol by etherifying the methylol group of a resol with a higher aliphatic or aromatic alcohol. This elegant method, devised by A. Greth, (16) offers a great variety of possibilities to combine resols with plasticizing ingredients. The process is the more convenient as one may start with common phenol or with cheap technical mixtures.

The various methods used for the production of urea-formaldehyde resins, which became known around 1930 (17), are essentially the same as that just discussed, except that the alcohols employed for etherification are limited almost entirely to butanol and *iso*-butanol. In combination with non-drying and drying-oil alkyds, the urea-formaldehyde resins became strong competitors of the plasticized phenolic resins, and of the alkyd resins themselves, in all applications where good hardness, together with low baking temperature, and pale color without extreme physical and chemical resistance, were required.

It is a matter of some surprise that in the early stages little interest was shown in plasticized resols in the United States and it is only recently that such an interest has developed there.

Also, the plasticized urea-formaldehyde resins ready for use (18) ought to be mentioned. Particularly during the last war these gained importance because of the shortage of natural oils. Frequently such urea resins have been combined with alkyl-phenol resins. In cases where improved water- and weather-resistance are vital, for example, in automotive finishes, urea-formaldehyde resins have largely been replaced by the more expensive melamine resins, which also contain alkoxy-methyl groups. (19)

The etherification of the methylol groups in a phenolic resin reduces the cross-linking potentiality in the final hardening process, and I and my collaborators worked on methods of making up this loss by replacing monohydric alcohols by polyhydric (preferably primary) alcohols, such as the higher glycols, poly-glycols or partial esters of pentaerythritol. (20) The object of this work was an attempt to effect internal plasticization by the introduction of chains between at least two resol molecules; this was not successful, at least in the sense as originally designed. These experiments, however, finally led to the combination of resols (21), particularly resols derived from unblocked phenols or even dimethylol urea (20), with materials of relatively high molecular size, such as polyesters containing a multiplicity of hydroxyl groups. When we consider that each molecule of such materials possesses 10 to 15, or even more, free hydroxyl groups, it is obvious that the highly reactive methylol component, e.g. a mixture of phenol poly-alcohols, will have far more chance of undergoing mutual etherification in at least one point of such a molecule. To some extent, such etherification may take place already in the reaction kettle as well as during the final baking of the film. There are indeed a number of indications that mutual poly-etherification between the methylol groups of both components does in fact take place. One such indication is the remarkable progressive increase in solubility of the reaction mixture in virtually non-polar solvents. Even when the plasticizing component greatly predominates, an extremely tough and hard film can be obtained by this process, which evidently is due to mutual etherification. Furthermore, the excellent resistance of the film to solvents is a further indication that homogeneity is not only apparent but real, and that the plasticizing component has been chemically combined.

When speaking of "compatibility" between the two components (resol and polyester), homogeneity thereof after being reacted will be understood. However, a necessary condition for complete compatibility is that the polyester should offer an adequate supply of methylol groups to the hardenable component. Here it must be borne in mind that the methylol groups of the hardenable component are capable not only of etherifying readily with one another, but also of combining chemically at the reactive nuclear positions in other resol nuclei, which reactions, of course, are very competitive to the desirable mutual reaction between the two components. It is possible within limits to define how many hydroxyl groups, or more particularly methylol groups, must be contained in a given weight of the polyester, in order to achieve compatibility with a specific resol derived from a given phenol, or with dimethylol urea. It is obvious that resols of low molecular size are more suitable for such combinations and that they furnish more resistant films than do resols of higher molecular size, which are already partially reacted in an undesired direction, thereby losing methylol groups.

Furthermore, in addition to hydroxyl groups, other groups capable of mutual reaction with the hardening component may be present in the plasticizing component. For this purpose natural oils, or their fatty acids, with conjugated double bonds, or rosin, which is comparable in this respect, as well as other unsaturated materials like maleic, fumaric, itaconic and aconitic acids may be introduced into the molecule. However, the presence of hydroxyl groups, and especially of primary hydroxyl groups in appropriate proportions, for example 3-6 per each thousand units, increases markedly the efficiency

of the hardening methylol compound; this is true even for resols derived from alkyl phenols, which actually do not depend upon the presence of hydroxyl groups for compatibility. This is another positive indication that mutual poly-etherification reactions do, in fact, take place.

I realize that the list of types of vehicles on which baking enamels are based, and of the mechanisms on which their hardening depends, is incomplete. At least I wish to mention polyvinyl acetals (22) and the epoxy resins (23), both of which have recently become very important, frequently in combination with hardenable resins, as for example in modern wire enamels. Particularly poly-urethane (24) resins deserve to be mentioned, since they are a classic example of formation of macro-molecules by a poly-addition reaction mechanism.

I must apologize for having given you such a detailed account of past methods, but doing so enables me to omit broad details regarding the water-soluble baking compositions which I finally developed, and the principles and the mechanism on which they are based.

There was, in fact, only one deductive step to these water-soluble products from the resin combinations based on poly-etherification reactions, wherein the plasticizing components contain a multiplicity of hydroxyl groups. However, many experiments and a great deal of patience were necessary before satisfactory practical results were achieved, and it was far from easy to demonstrate the soundness of my basic idea.

Principle

The principle (25) itself is very simple. The molecule of the plasticizing component contains one or more carboxyl groups, and as a result is able to form water-soluble soaps with ammonia or other strong water-soluble nitrogen bases. The presence of a relatively large number of free hydroxyl groups also contributes greatly to water solubility, so that, generally speaking, a relatively small number of carboxyl groups suffice for this purpose. For instance, an acid value considerably below 100, in some cases even as low as 30, is adequate. The low molecular hardening component, however, does not necessarily require the presence of carboxyl groups, the more since its proportion in the composition is generally lower than that of the plasticizing component.

The main obstacle to the practical realization of my basic idea was, as you will readily understand, the difficulty in obtaining uniform wetting characteristics and even flow properties in the aqueous product in application. The strongly polar character of the aqueous solution, as well as of the film forming components themselves, especially when heated, normally tend to crater formation, pin-holing, pitting and retrogression of the film, resulting in bare patches. As a matter of fact, these and other defects have generally been experienced with all the water-soluble varnishes which have been known up-to-date. (26)

In the case of aminoplasts, a certain degree of success has been achieved by a pretreatment of the mixture of the two prevailing principal components, in order to bring about some mutual etherification analogous to the older process I described above in detail. When using a resol (a phenol alcohol) as hardening component, it was found to be absolutely essential to reduce the average polar character of the total composition. Particularly, the introduction of relatively long chains containing no hydroxyl groups into or at the ends of the molecules of the plasticizing component, proved to have a very favorable effect. The suitable number of available hydroxyl groups had to be placed, if necessary accumulatively, in single points of the molecule, figuratively I may say like "bundles". Furthermore, it is advantageous to introduce hydrocarbon substituents also into the hardening component, whereby simultaneously the "compatibility" with the plasticizing component is easier to achieve (as explained above). In short, suitable and serviceable compromises had to be devised.

Solubility

In some cases the polarity of the plasticizing component may be so small that the aqueous solution of its soap becomes pasty at higher concentrations, as do the soaps of higher fatty acids. After mixing such a resinous soap with a phenol alcohol, however, it becomes perfectly fluid and flows like a varnish, as is necessary for its further use. However, the addition of large amounts of water does not decrease the viscosity to the same extent as do organic diluents when added to a conventional varnish. Smaller proportions of lower alcohols, however, decrease the viscosity considerably, similar in degree to the effect of added mineral spirits upon many alkyd resins. This effect is most pronounced when an alcohol with a limited solubility in water, such as *N-iso-* or *sec*-butanol, is employed.

In general, the addition of a very minor proportion (that is to say, up to 10% of the total diluents) of an organic solvent is necessary to secure perfect solubility and dilutability with water to any desired extent; this might be considered, however, as an excusable "lack of beauty". Most suitable for this purpose are medium- and high-boiling, perfectly water-miscible alcoholic solvents, such as cellosolves, diglycol-mono-ethyl ether, lactates, ethoxy butanol, di-acetone alcohol, and so on.

Soap-Former

Now I give you some details of the third component, which, as previously indicated, is of alkaline nature and functions as a soap-former. In most cases, cheap and readily available ammonia will be used. There exists, however, quite a number of other well-adapted and relatively cheap nitrogen bases, which in some cases are preferable to ammonia. The presence of small alkyl groups in such amines as mono-, di- and tri-methylamine have also some favorable effect on flow properties, analogous to the influence of the hydrocarbon groups present in the two major components, while alkyl-olamines furnish, in certain cases, still better solubility in water than ammonia. I shall mention as examples the three ethanolamines, aminopropanol and amino-*iso*butanol, all of which are readily available today.

The hardenable methylol component always contains small quantities of free formaldehyde, or formaldehyde will be split off in the later phase, a fact which is particularly true of some of the aminoplasts. As known, formaldehyde

reacts with ammonia to form hexamethylenetetramine, and also the primary and secondary amines readily undergo reaction with formaldehyde. Thus it is necessary in practice to use more of these products for neutralization than the amount calculated from the carboxyl groups present; in some cases the pH value must be adjusted by further additions after aging.

However, tertiary amines, such as trimethylamine or tri-ethanolamine, do not react with formaldehyde, and solutions prepared with these amines consequently do not show a progressive change in pH value on aging. Frequently it is unnecessary to add such an amount of the alkaline component as to achieve complete neutrality; so much amine as to achieve an alkaline range (e.g., pH 8) might even reduce the water dilutability instead of improving it. These facts are important in that pigments which are not stable to alkalies may consequently be used with safety. During baking, a certain amount of formaldehyde is split off and this formaldehyde reacts with the ammonia bound in the soap, giving hexamethylenetetramine. While for its formation, four mols of ammonia are necessary, it behaves like only one molecule of ammonia. Thus, during baking, a certain number of carboxyl groups are freed and exert a catalytic effect upon the various condensation (hardening) processes. When tertiary amines are used, a reduction in rate of cure is noticeable. By the use of tertiary amines in admixture with other bases such as ammonia, it is possible in certain cases, such as with urea formaldehyde condensation products, to regulate adequately the speed of hardening.

It is possible, on the other hand, to increase the curing speed in many cases by the addition of ammonium salts of strong acids, these salts being practically as active as the acids themselves for the reasons given above. Most suitable for this purpose are acidic materials which, though themselves insoluble in water, furnish water-soluble ammonium salts (soaps). Sulphonic acids, and more especially partial esters of phosphoric acid, the use of which I have described earlier (27), are especially recommended.

I cannot yet give you an explanation of what finally happens to the nitrogen base during curing of the film. Let me give you, however, some analytical data on the nitrogen content of a certain resol combination after curing. These nitrogen determinations were made in the micro-chemical laboratory of the University of Graz.

When ammonia was used, 0.58% of nitrogen was found to be present in the film, this being equivalent to about half the quantity of ammonia required to neutralize the plasticizing component, or about 36% of the total quantity used. When ammonia was replaced with methylamine, somewhat less than 0.58% of nitrogen was found to be present in the cured film. When triethanolamine was used in an amount somewhat less than that required for complete neutralization, practically the whole of the calculated amount of nitrogen, namely 0.93%, was found to be present in the cured film.

I have named this new type of vehicle to be used as base for water-soluble varnishes "Resydrin". This material, which has a solid content from 75-80% (the remainder consisting of water and water-miscible organic solvents), is the combination of the hardening and plasticizing component, which, however, becomes water-soluble only after addition of the alkaline component, whereupon "Resydrol" is formed. In order to determine proper addition of the alkaline component, e.g. ammonia, the use of bromothymol blue or Universal indicator is most suitable. Ammonia or the like should be added until the solution, upon addition of this indicator, turns olive green to olive brown in color; the basic color is about the same as that when this indicator is added to ordinary tap water. However, sufficient water dilutability is largely achieved even when methyl red or universal indicator still show red, which is to say before bromothymol blue turns to green.

Precautions and Properties

I feel obliged now to draw your attention to a more important "lack of beauty" regarding "Resydrin", or more particularly "Resydrol". If phenol alcohols (resols) are present as hardening component, one must bear in mind that they are relatively unstable materials which even at normal temperatures increase in molecular weight, and consequently become less water-soluble, a process which is accelerated in the presence of the acid plasticizing component. The blend (Resydrin) nevertheless remains comparatively stable for a few months if stored in a cool place. However, the stability decreases rapidly after ammonia has been added to form "Resydrol" even if the quantity of ammonia is far less than that necessary to achieve extended dilutability with water. "Resydrol" is stable for only one to two weeks. No doubt the ammonia promotes crosslinkings (28), a phenomenon which is desirable indeed for the curing of the "Resydrol" to the "Resydrit" (my name for the cured state), despite its undesirable influence on the stability of the "Resydrol".

Ammonia should only be added shortly before the final application of the material. Since, in my opinion, logically the major proportion of the diluent water should be taken from the faucet in the paint shop, not in the varnish manufacturing shop, this addition of water should be done simultaneously with the conversion of "Resydrin" to "Resydrol".

Of course, all objects to be coated must be carefully cleansed of grease, and, although this might appear evident, I wish to emphasize it and strongly draw your attention to it. A car body, for example, which has been intensely sprayed with an aqueous degreasing agent, followed by a wash, or one which has been Bonderized, is certainly clean enough to eliminate any adverse effect on the wetting and flow characteristics. Sufficient degreasing is also achieved by completely dipping the object in a solvent or solvent mixture, which procedure may be followed by rinsing in a batch of fresh solvents. A generally unsatisfactory method, however, is cleansing with a rag moistened with solvent, even if such method is satisfactory when using common types of paints.

Since Reichhold Chemie A.G. is going to start the production on a large scale so far with only one type, namely Resydrin 207, I am sure that some of you will get to know this product. Please store

the sample in a cool place until you are ready to commence your experiments. If your first experiments, which will probably be carried out with a clear varnish, show craters or similar defects, do not abandon your experiments, but bear in mind my hints given above.

In order to obtain a clear dipping varnish, the Resydrol should be diluted to 40-50% solids content. It should be baked at 160°C minimum, but preferably at 170°C or even higher. In order to obtain glossy, flexible films which are very hard and scratch resistant (mar-proof), a curing time of 10-15 minutes is sufficient, but by doubling this time the resistance of the film to boiling water and solvents will be increased still further. Also, infra-red baking has proved to be perfectly satisfactory, especially when working in the non-visible wave range. Excellent results have been obtained with, for example, reflector temperatures between 220 and 240°C, and surface temperatures of 140-160°C with exposure times of 8-10 minutes.

In addition to the properties already mentioned, which are those generally expected in baked films, the "Resydrit" films possess outstandingly good adhesion, even on light metals and copper, a property which will suggest special fields of application for Resydrin 207. Even with extremely high pigment contents, primers and spraying-fillers may be obtained with outstanding adhesion, flexibility and impact resistance, permitting in consequence deep pressing to an unusual extent. Such layers may be rubbed down easily and have the further advantage that a top-coat of normal composition over such a primer possesses an exceptionally good body.

It is also possible to make glossy finishes with Resydrin 207, but in this case the proportion of pigments should be relatively small. Since films of Resydrin 207 yellow slightly upon baking, it should be used only for the production of definitely colored enamels. It is hoped, however, that it will soon be possible to produce a type furnishing colorless films after baking, without sacrificing any of the excellent properties of Resydrin 207.

Clear lacquers, priming coats and top-coat enamels are best applied by spraying through a wide nozzle. Other suitable methods of application include dipping, roller coating, flowing, and in certain cases brushing and knifing.

Resin may be thinned with tap water, then applied, water allowed to evaporate, and heat applied direct, or object may be baked.

Pigmentation

Two methods for making pigmented products from Resydrin or Resydrol are suggested:

1. The dry pigments are mixed with the Resydrin in a Werner-Pfleiderer, Banbury, or similar mixer, after which they are ground in a normal manner. Where high pigment proportions are employed, it is desirable to add a small amount of a lower alcohol, such as butanol, which, as previously explained, greatly supports the cutting power of water. To this highly concentrated paste are added, shortly before use, an appropriate amount of water, and the requisite amount of ammonia as previously determined on a sample of clear Resydrin.

2. A paste is made from the dry pigment and water, together with a wetting agent if required, using a high-speed mixer or ball mill. After the addition of the calculated amount of ammonia, the aqueous pigment dispersion is mixed with the Resydrin, more water being added as required.

In the case of the second suggested method, it is logically advantageous to use aqueous pigment pulps, which are commercially available in a wide range, thus eliminating the grinding process.

Water as the Solvent

From the ultimate application of the paints on a technical scale it is necessary to give proper consideration to the exceptional nature of the principal solvent, which in this case is water. Whereas with normal products, solvents and diluents may be selected from the great assortment available, in order properly to adjust drying and flow properties, etc., in the present case such a choice is only possible within a very limited range. A so to speak passive adaptation to the prevalent solvent and diluent of an entirely new kind will be necessary. Many longstanding habits will have to be modified if not decisively changed, or, indeed, entirely new approaches will become necessary.

Knowing the properties of ethers, and reasoning by analogy, we might expect water to be a gas even on winter nights at the North Pole. By analogy with alcohols, its boiling point might be as low as 50-55°C. We know, however, that, due to its extremely high polarity, water has a considerably higher boiling point, though not as high as to place it outside the range of so-called "low-boiling solvents".

The tables to be found in all books on organic solvents (29) indicate relative evaporation rates, equal conditions provided, as follows: When ether equals 1, alcohol is 8.3, butanol 33, cellosolve 43, di-acetone alcohol 147, cyclohexanol 403, benzyl alcohol about 1770, ethylene glycol 2625; and as examples of non-polar solvents, the comparison number of xylene is 13.5, decalin 94, tetralin 190. That of the ester butyl acetate is 12. In such a table the corresponding value of water would range between 70 and 75. From this figure, it can be seen that water is similar in this respect to the average so-called "medium-boiling" solvents.

The picture is quite different when we consider the heat of evaporation—that is, the quantity of heat which will be absorbed from the surroundings during evaporation. Heat of evaporation per unit of weight is a measure of the energy required to convert a liquid to a gas at atmospheric pressure, and it depends upon the molecular weight and to some extent upon the degree

of polarity of the compound. The enormous heat of evaporation of water, with its very low molecular weight of 18, is 586 calories, which is entirely divergent from that of organic solvents, especially of the non-polar types. For example, the value is more than 2½ times that of the heat of evaporation of ethanol, 5 times that of butanol, 6 times that of ethyl acetate and, even 7-10 times that of xylene or white spirits.

This fact must be taken into consideration by all means! Especially when painting large objects, a much greater time should be allowed between the application of the paint and the start of the baking, whatever type of heating is used. Evaporation might be supported by forced ventilation, and, wherever possible, by somewhat elevated temperatures. Also, the continuously varying relative humidity of air should be taken into consideration. Whatever the means, the paint should be as dry as possible before it is subjected to baking in order to avoid dissipation of a considerable proportion of the heat before curing actually sets in. The right measure of heat exposure is necessary here, as in any other baked finish, even though the limits of baking conditions are relatively wide with Resydrin 207.

From these remarks it clearly follows that it would be improper not to inform users of such an aqueous baking coating material that the product contains water. On the contrary! In order that this new material may meet with success—and there is no doubt that its acceptance would definitely mean technical progress in many respects— the user must be made aware that water is a substantial ingredient, as well as being warned of its weak points. I myself am completely aware that such teaching in practice will involve some difficulties.

I would appreciate it very much if my colleagues in the paint industry would meet Resydrin with an open mind and without prejudice. As has already been stated, one type only will be available for the time being, so please do not expect this one type to achieve everything and to solve all the special problems for which you have been unable so far to find a solution elsewhere. This one type is, however, relatively versatile. The corresponding Resydrol, made with the addition of ammonia, is shortly after its preparation infinitely dilutable with water so that in this respect no difficulties will arise. If the object to be coated has been properly cleaned, and if the baking conditions are suitably chosen, a film will be obtained which is uniformly smooth and glossy, both extremely hard and elastic, with excellent adhesion, and with outstanding resistance to oil and mineral spirits, as well as to water and weather. Speaking generally, however, Resydrin 207 is not the last word for every requirement. With relatively minor modifications, a type possessing remarkable petrol resistance may be obtained. The rather marked yellowing of the baked film may be reduced to a considerable extent by replacing ammonia by a tertiary amine, but if non-yellowing is a major requirement for you, I suggest that you wait until a type has been developed which does not yellow and which can perhaps be baked at lower temperatures. I would appreciate any positive criticism or suggestion, since I know that the technical success, for which I hope, depends upon the open-minded and comprehensive collaboration of all interested parties, from the chemist in the research laboratory, through the chemist and technician in the paint factory, to the engineer and workman in the paint shop.

The paint technician especially will find that he is obliged to struggle not only with the tricky *physical matter*, but probably still more with prejudice, old-fashioned habits, inertia, and sometimes even lack of understanding; in short, with all the normal *human weaknesses*.

I am convinced, however, that with good will it should be possible to overcome these early difficulties and gradually to broaden the field of applications for aqueous industrial paints.

Then, when the last man in the line of users has learned the many advantages, and grown accustomed to the modified operating methods, he will certainly not want to return to the older practices.

I do not want to end my paper without expressing my most sincere thanks to everybody who has helped me to put this child on its feet, and to all those who have taken its hand in a friendly way.

I request you to do the same in times to come, to help teach this child to walk with confidence, and help smooth out the bumpy road it has to travel.

Footnotes and Bibliography

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2. These products are based on U.S.P. 1,895,873 (Kienle), not issued at that time.
3. U.S.P. 954,666 (Baekeland).
4. Evidence therefore is mainly owing to the scientific work by M. Koebner, A. Zinke, K. Hultzsch and H. v. Emuler.
5. Beckophen 514; coating black iron sheets for food cans.
6. Compare Scheiber, "Chemie und Technologie der kuenstlichen Harze", Stuttgart 1943, 548. See also Ellis, "The Chemistry of Synthetic Resins", Reinhold, N. Y. (1935), Vol. I, Chap. 21 (and elsewhere).
7. Austrian Patent 120,679 (1927), German Patent 584,858. Compare also U.S.P. 1,800,29?/6 (1928) and 2,049,447 (1932).
8. H. Hoenel, Paper February 17, 1938, London Meeting of the Paint and Varnish Chemists Association.
9. See footnotes (7) and (8), also H. Hoenel "Superbeckacite 1001", Vienna, 1932.
10. K. Hultzsch, J. prakt. Chemie 158,275 (1941), compare also footnote (4).
11. Compare A. Greth, Kunststoffe 31,345 (1941).
12. For instance Beckophen 97, Bechonit 540 N and Luphen B-Types.
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17. Plastopal H and W in Germany, Beckamine in USA.
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27. U.S.P. 2,272,668 and U.S.P. 2,330,286.
28. A Zinke and F. Hanus, Monatshefte fur Chemie 78, 311 (1946) and 79, 26 (1947). Compare also K. Hultzsch, Kunststoffe 41, 109 ff (1951).
29. Compare for instance H. Gnamm "Die Losungmittel und Weichmachungsmittel", Stuttgart 1950, 31 and 301.

Program Highlights Of 65th Convention

ACCENTING their annual convention slogan, "Progress Through Cooperation," members of the National Paint, Varnish and Lacquer Association held their 65th convention in Atlantic City, October 26-28th.

With latest figures indicating a record-breaking year for paint sales, executives and managerial members of the paint industry were on hand to obtain the opinions and forecasts by high government officials on our national economy. Excerpts of important speeches delivered at this convention are presented in the following paragraphs.

Report of Pres. Joseph F. Battley

"We have enjoyed a productive and prosperous year. I am sure no one of us will lament the fact that nobody has yet succeeded in talking us into a depression. There has been some reduction in government spending because of the truce in Korea, but this has been gradual and will continue so. We do not have to rely upon emergency spending to be prosperous in the United States. And we can be assured of a healthy, normal economy." "Your industry will again set a new record in sales as reports of the Bureau of the Census to date indicate that the upward and record-breaking trend will continue. Dollar sales for the eight months' period are $975,536,000. This represents an increase of 6.2 percent over 1952 and topping our record year of 1951 by 1.4 percent."

"I feel happier about the prospects for peace than I have for some time. As you well know, it has been my often-expressed opinion that a continuation of our firm policy toward aggressor nations and a repeated declaration of our intention to resist any extension of communistic influence is our best guarantee of peace. I think the success of this policy has been clearly demonstrated in the past years, especially in Korea. Should there be other outbreaks of a similar nature in the world, and there is certainly a possibility in Indo-China, I feel confident the administration will continue this policy, and halt the expansion of communism as well as an all-out war. You can be assured of one fact—President Eisenhower will never compromise with national security. Whatever may face him—politically or economically—I know him well enough to be absolutely confident that the security of this country will receive first consideration."

In reporting on the activities of the Scientific Section, President Battley discussed the expanded work which is being carried on moisture and its effect on paint films. Other work mentioned include pigment dispersion and a test for retardant paints.

The work on dispersion resulted in the Shurts high speed stone mill, the test tube paint plant, and the evaluation of the dispersion quality of solvents. Work on test methods for specially formulated fire-retardant paint has resulted in the development of a stick and wick method for testing quality.

Another important topic covered in the report was paint production by the Navy and President Battley said, "The presentation of our industry's case before the Harden Subcommittee convinced the Navy that much of its paint manufacturing activities could be discontinued. As a result of this curtailment, it is presently estimated that total paint production at both Mare Island and Norfolk during fiscal 1954 will be only 1,800,000 gallons as compared with over 4,800,000 gallons during fiscal 1953. We will continue our efforts until the remaining manufacturing activities are completely closed. We support the program to eliminate all government competition with all private business."

Dr. C. E. Manion

Dr. Clarence E. Manion, Chairman, Commission of Intergovernmental Relations warned the audience to strive to protect the basic freedoms as expressed in the Declaration of Independence and the Constitution as our nation is the only place on earth in which a man in his own name can shout the authority of his government.

Dr. Manion emphasized that United States treaty law imperils the United States Constitution. He criticized Secretary of State, John Foster Dulles for the State department's opposition to curtailing treaty powers, and that the United Nations extended the powers of treaties intra-nationally as well as internationally. He also blamed former Secretary of State Dean Acheson for killing a resolution sponsored by fifty Senators, that would place Constitutional powers above treaty powers, and advised the audience to support a similar resolution now in the hands of the Senate Judiciary Committee by writing to their respective United States Senators.

Honorable Walter Williams

Highlights of the talk, "An Official Look at America Under A New Administration," by the Honorable Walter Williams, Under Secretary of Commerce are as follows:

"I feel we need not fear for the future of our economy if all industry and their trade associations will, with intelligence and aggressiveness founded on a faith in their products, take action to:

1. Understand the great markets of the future in the specific terms of the potential demand for their products;
2. Make plans to initiate production and sales programs which will be adequate to meet the scale and needs of these future markets;

(*Turn to page 49*)

Candid Shots At Recent Paint Industries' Show

(LEFT TO RIGHT IN EACH CASE)

1—A. Errico, Paint and Varnish Production, H. A. Cook, Dow Chemical Co. 2—J. Broeker, E. I. du Pont de Nemours, Pigment Dept., H. H. Shuger, Baltimore Paint & Color Works. 3—G. H. Wescott, former Pres. of Federation of Paint and Varnish Production Clubs. 4—V. C. Bidlack, Pennsylvania Color and Chemical Co., N. J. Timmons, Rohm & Haas, Dr. A. Schwarcman, Spencer Kellogg and Sons. 5—A. Lowe, G. Spiller (both of Delaware Chemicals, Inc.), T. Donnelly, S. Rogaliner (both of Cargill, Inc.). 6—F. J. Gunn, Dow Chemical Co., A. E. Verbyla, Lenoir Wood Finishes, H. P. Morand, Dow Chemical Co. 7—Mr. and Mrs. J. Prane, Mr. and Mrs. B. Chatzinoff, R. Chaleff, B. Farber, K. A. Earhart, G. Spiller, A. Lowe, S. Cohen. 8—A. Saunders, RBH Dispersions, W. F. Whitescarver, Am. Cyanamid, A. H. Gibson, Valspar, H. D. Craft, RBH Dispersions. 9—E. Ford, L. G. Parkinson, D. C. Van Winkle, all of Atlas Powder Co. 10—M. Pinkerman, C. Streblow, both of Reichhold Chemicals, Inc. 11—N. D. Scowe, J. H. Devine, A. R. Skelton, A. W. Insley, J. P. Hill, all of Mineral Pigments Corp. 12—R. H. Kampschulte, Celanese Corp., M. A. Snell, Am. Mineral Spirits Co., D. D. Hecht, Celanese Corp. 13—R. E. Dodd, Durez Plastics and Chemical Co., H. Farkas, S. Craig, both of U. S. Stoneware Co. 14—W. M. Young, Monsanto of Canada, Ltd., A. Goodacre, Monsanto Chemical Co., J. M. Linetty, Trojan Powder Co. 15—A. A. Somers, Dr. A. Brauch, both of Carbon Dispersions, Inc. 16—R. M. Lauderbaugh, The Neville Co., C. O. O'Brien, F. G. Weigand, both of Chem-Oil, Inc. 17—H. E. Brown, New Jersey Zinc Co., W. Parke, Harshaw Chemical Co. 18—D. Burns, Metals Disintegrating Co., A. C. Mueller, A. C. Mueller Co., H. E. Collins, H. R. Sheaffer, both of Metals Disintegrating Co., M. Bell, Longwear Paint and Varnish Co., J. A. McKinley, Metals Disintegrating Co. 19—P. Calo, Philip Calo Co., J. Powell, Paint and Varnish Production, D. L. Grubbs, Morehouse Industries, Inc., F. Calo, John H. Calo Co., N. Klein, Morehouse Industries, Inc., E. N. Scala, Foster Pump Works. 20—W. R. McClayton, Sr., Pacific Vegetable Oil Corp., W. H. Campbell, Jr., Garrigues Stewart, W. R. McClayton, Jr., Pacific Vegetable Oil Corp. 21—V. Larson, Hercules Powder Co., D. A. Kohr, Lowe Brothers Co. 22—Mr. and Mrs. A. S. Voluck, E. Jeanne, Epworth Mfg. Co. 23—R. W. Linley, Western Paint Review, A. B. Doran, Union Bag and Paper Corp. 24—L. K. Ross, C. K. Ross, Jr., J. Teleky, Mrs. C. K. Ross, Jr., all of Charles Ross & Son Co.

Program Highlights Of 31st Annual Meeting

"PROGRESS Through Applied Science' 'was the theme of the 31st Annual Meeting of the Federation of Paint and Varnish Production Club held in Atlantic City during Oct. 29-31.

Registration figures showed that over 1700 members and guests were on hand to hear the various club papers, round table discussions, the keynote address by Dr. Roy H. Kienle and the Fifth Joseph J. Mattiello Lecture by Dr. A. C. Elm.

Pres. G. H. Wescott

In his annual report, President Gustave H. Wescott traced the activities of the Federation during the past year. He emphasized that there is need in the industry of more technically trained men and urged that campaign be initiated to interest students in opportunities offered in the coating field. President Wescott also paid tribute to the joint Federation and Association Educational Committee in their untiring efforts which has resulted in the initiation of more paint technology courses at various universities and colleges.

He pointed out that the growth of the paint industry into a practical science has been phenomenal and that the industry has met many challenges with new types of products. Old standbys have been modified to perform many new uses; new raw materials have meant better quality products and a lower cost. However, there were many technical problems still confronting the industry, and these included dispersion, stability, heat resistance, flame repellance, moisture difficulties, corrosion, color permanency, film disintegration, etc.

J. F. Battley, Pres. of NPVLA

Joseph F. Battley, president of the National Association paid particular tribute to the technical men of the paint industry. He said that the high sale of paint is directly attributed to the work of the technical men of our industry in developing new and improved products. With competition returning, the technical man will have a more important role in the activities of his company.

President Battley gave particular reference to Association's stand against the manufacture of paint by the Navy. This stand resulted in a considerable curtailment of Navy manufacturing. He emphasized, however, that the industry is now on trial to produce high quality paint, to meet specifications, and deliver on schedule, and these responsibilities fall directly on the shoulders of the technical men.

President Battley then gave his opinion of the international situation in which he stated that technical developments in armaments, munitions and atomic and hydrogen bombs will be a deterrent for commencing another war in our generation.

Keynote Address

A highlight of the 31st Meeting was the keynote address by Dr. R. H. Kienle, director of Applied Research, Calco Chemical Div., American Cyanamid Co. His subject was, "The Protective Coating Industry: A Practical Science."

Dr. Kienle traced the technical development of the paint industry in the United States pointing out that in the early 19th century our paint processing was an art—the work of a master craftsman. This part of industry then went through the trial and error stage and finally today it can be classified as an exact science in which all phases of science are utilized to the fullest extent.

The technical growth of the paint industry was due primarily to demands of the customer, availability of new raw materials which emerged from expansion and development of the chemical industry as exemplified in nitrocellulose after World War I and synthetic latices after World War II.

Mattiello Lecture

As in previous years The Joseph J. Mattiello Lecture was attended by a capacity audience. This year's lecture, was delivered by Dr. A. C. Elm, Research Supervisor, New Jersey Zinc Co. (of Pa.). His topic was "Some Mechanical Properties of Paint Films." A resume of this lecture is as follows:

The distensibility and tensile strength of paint coatings, though important film properties, represent but a small segment of the complete pattern of mechanical properties. They are markedly affected by such factors as rate of loading, temperature, humidity, age and past history of the test specimen, pigment concentration, pigment particle shape and size, and chemical and physical properties of the pigment surface. Given proper consideration to these factors, it is possible to deduce from distensibility and strength measurements information of value regarding the internal structure of paint films. It would seem that a better understanding of these relationships could contribute materially to the solution of practical paint problems and the development and successful application of new coatings materials.

Education Session

M. A. Glaser, chairman of the Federation Educational Committee reported on the work done to foster paint education by advocating more paint courses at our colleges and universities.

Dr. J. W. Tomecko, chairman of the Federation Educational Committee High School Subcommittee provided some information on what was being done to interest those of high school level in the opportunities of the paint industry.

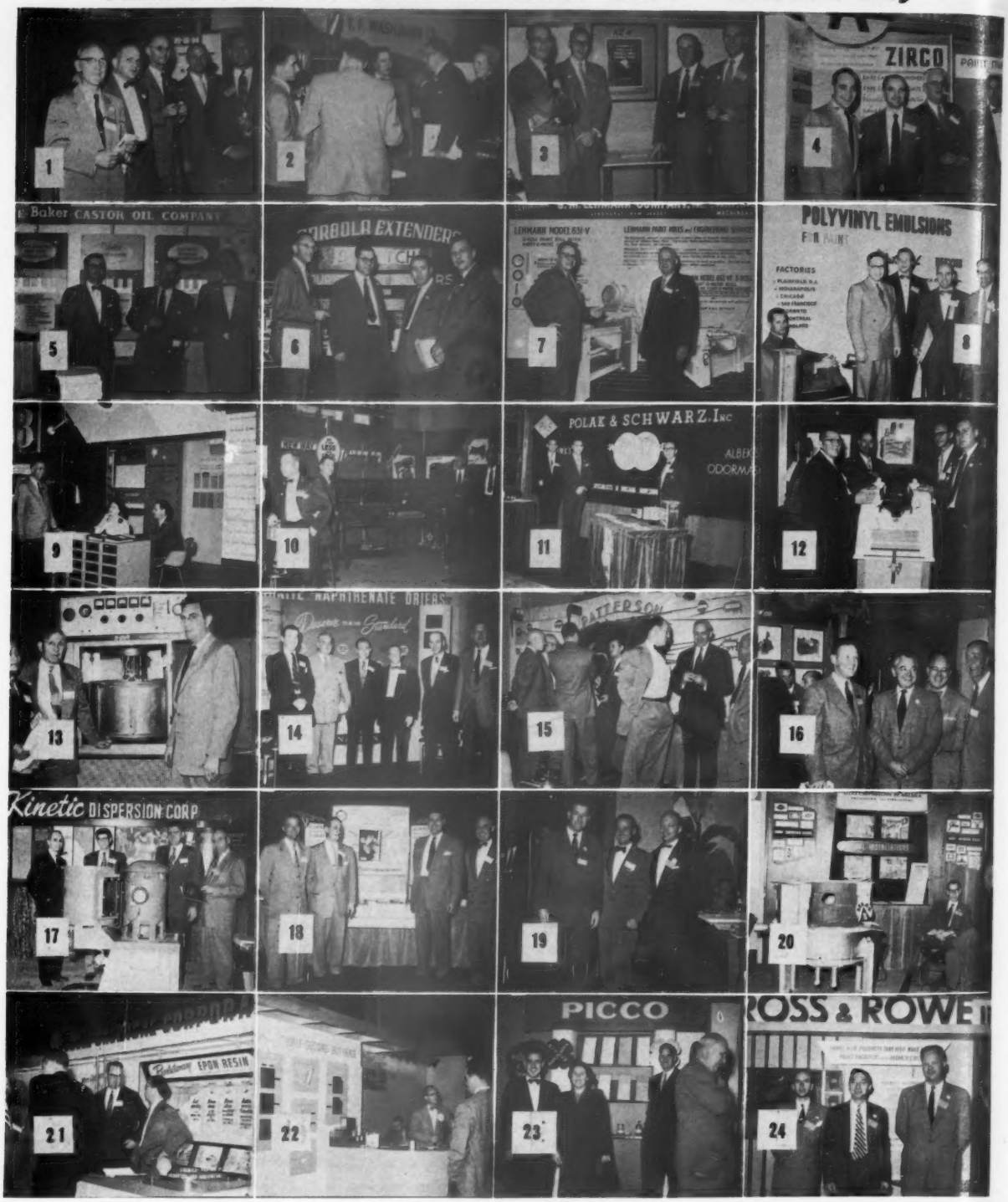
A talk, flow chart together with slides have been devised by this subcommittee as guides in presenting the story of the paint industry to high school students.

Research Session

P. O. Blackmore, chairman of the Research Committee reported that work on research study dealing with the deterioration of vehicles and drying oils has been completed, and urged member clubs to send in their suggestion for a future projects which will be considered by the committee. He also reported on the Federation's Color Aptitude Test and the favorable results they received from those using it in their plants.

(*Turn to page 50*)

Candid Shots At Paint Industries' Show -- Atlantic City



(LEFT TO RIGHT IN EACH CASE)

1—C. Streblow, Reichhold Chemicals, Inc., R. M. Steiding, H. L. Norris, W. W. Rost, all of R-B-H Dispersions. 2—R. T. Fitzsimons, T. F. Washburn Co., Mr. and Mrs. J. Potter, Potter Chemical Co. 3—E. K. Zimmerman, National Lead Co., R. E. Ringen, O. H. Garlick, B. Sala, all of Paul O. Abbe. 4—T. Brioux, M. K. Antonivich, C. K. Mullin, G. W. Gregg, all of Advance Solvents and Chemical Corp. 5—J. W. Hayes, Baker Castor Oil Co., H. C. Stocking, Samuel Croot Co., L. Jubanowsky, Baker Castor Oil Co. 6—H. T. Koenig, Carbola Chemical Co., G. Gettemueller, H. J. Gettemueller Co., Dr. D. Sonnenschein, Durolite Paint Co., W. L. Smart, Carbola Chemical Co. 7—C. B. Hoffman, J. M. Lehmann Co., Inc., J. H. Abraham, Cloverleaf Paint and Varnish Corp. 8—H. J. Zahrndt, R. J. Delack, both of National Starch Co., W. E. Santoro, Monroe Sander Corp., W. J. Greco, Socony Paint Products. 9—L. Moeller, Hercules Powder Co., L. G. Nunn, Antara Chemicals Co. 10—K. B. Seuerson, E. J. Abendscein, W. B. Sanford, all of Chisholm-Ryder. 11—H. Fields, L. Davids, G. M. Bitzick, all of Polak and Schwarz, Inc. 12—E. Peters, F. W. Weitzner, both of Kent Machine Co., M. Shor, A. H. Wirz Co., D. Freedman, consultant. 13—H. Hasegana, Tokyo Paint Co. Ltd., E. H. Smith, Klimate Pruf Paint Co., J. E. Norton, Atlas Electric Devices. 14—J. C. Smith, H. M. Johnson, G. S. McTavey, A. S. Applegate, A. H. Searl, A. P. Fleming. 15—The Patterson Foundry and Machine Booth. 16—D. McGowen, J. Meyer and Son, R. L. Parker, Standard Ultramarine Co., C. J. Finaren, Finnaren and Halley Co., W. A. Weismann, U. S. Industrial Chemicals. 17—C. E. Kew, Kinetic Dispersion Corp., B. L. Jacobson, Sandure Paint Corp., W. Anderson, Devoe and Raynolds, L. S. Behrns, Kinetic Dispersion Corp. 18—W. Schulz, Barada and Page, Inc. M. A. Glaser, Midland Industrial Finishes Co., O. E. Hempel, Edgar Brothers Co., M. D. Beck, Commerce Petroleum Co. 19—C. M. Paisley, Phillips Petroleum Corp., B. J. Davis, Shell Oil Corp., R. Lynch, R B.H Dispersions. 20—C. A. McFadden, Selas Corp. 21—Shell Oil Booth. 22—F. M. Ball, Eastman Chemical Products, Inc. 23—J. Wilson, Penna. Industrial Chemical Corp., Mrs. J. B. McAuley, Jr., K. Engerud, Penna. Falk Chem. 24—D. H. Elliot, W. K. Hilty, J. C. McAuley, all of Ross and Rowe.

Dr. H. L. Gerhart

Pittsburgh Plate Paint Director Honored by Franklin & Marshall

Dr. Howard L. Gerhart, director of research for Pittsburgh Plate Glass Company's Paint Division, has been awarded an honorary Doctor of Science degree by Franklin and Marshall College, Lancaster, Pa.

Dr. Gerhart received the award, made at a Founder's Day Convocation, in recognition for his work in the field of industrial research. Among other accomplishments, he was instrumental in the development of Selectron resins now widely used in the plastics industry.

A graduate of Franklin and Marshall College with a B.S. degree, and Northwestern University with a Ph.D. degree, Dr. Gerhart has been associated with the Pittsburgh Plate Glass Company since 1937, when he joined the paint division research staff at Milwaukee, Wis., as a research chemist. He was named Director of Research of the Division in 1947.

•

Quaker Oats Company Begins Production of Furfuryl Alcohol

The Quaker Oats Company, Chicago, has begun production of furfuryl alcohol at Memphis, Tenn., using a new catalytic hydrogenated process developed in its Research Laboratories.

Built at a cost of about $600,000, the new plant uses a continuous vapor phase process and has facilities for recycling excess hydrogen as well as catalyst regeneration.

Shipments of furfuryl alcohol from the new plant are expected to commence this month.

Calco Chemical Wins N. J. Mfgrs.' Award for Public Relations Efforts

The Calco Chemical Division of American Cyanamid Company, Bound Brook, N. J., has been given the "Award of Merit" for public relations communications by the New Jersey Manufacturers Association.

The award, presented in conjunction with "The Voice of New Jersey" radio series, held during the week of October 25, was given to S. C. Moody, vice president of American Cyanamid and general manager of Calco Chemical, by Michael J. Hickey, secretary of the NJMA:

•

DeVilbiss Establishes School for Personnel Servicing its Products

The DeVilbiss Company, Toledo, O., has established an equipment service school primarily for personnel who are engaged in servicing its products.

The school's curriculum includes courses in DeVilbiss spray painting equipment, function and operation of the equipment as well as advanced servicing techniques. Curtis R. Pipes has been appointed supervisor of the training program.

While movies, cutaways, and other training aids will be used in the school, Mr. Pipes said a great majority of the DeVilbiss products will be disassembled and instruction given on repair and maintenance techniques.

Present plans are to keep classes small, not exceeding seven persons so maximum benefit can be gained from the instruction.

•

Materials Handling Company Enlarges Manufacturing Facilities

Palmer-Shile Company, Detroit 27, Mich. has announced the addition of 15,000 square feet of manufacturing space.

Known as plant 4, it is the firm's third expansion in the past three years.

Palmer-Shile also announced purchase of new equipment to handle the increase in production.

•

Lenk Company Constructs Pressure Filling & Testing Plant in Kentucky

A 10,500 square foot plant containing the latest facilities for pressure filling and testing has just been completed by the Lenk Company at Franklin, Ky., a subsidiary of The Lenk Manufacturing Company, Boston, Mass.

Pilot runs have been completed on several of the firm's products used by container manufacturers supplying the paint, drug, cosmetic and insecticide industries, a firm release said.

The new building is of reinforced concrete and concrete block construction.

F. K. Quigley

W. A. Henson

Dow Chemical Forms New Service Section in its Coating Department

The Dow Chemical Company of Midland, Mich., has appointed Walter A. Henson to head a new development and service section of its Coating Technical Service.

The new group, formed to supply broader services to the paint industry, will concentrate on the application of monomers in the manufacture of vehicles and resin intermediates of interest to the paint and coatings industry.

Mr. Henson had served as head of the paint section of the Coatings Technical Service since 1950. Succeeding him in that position is Fred K. Quigley, Jr., who formerly headed Dow's technical and development work in the textile industry since 1948.

Mr. Henson joined Dow in 1941, spending nine years in the firm's research laboratories at Midland. He devoted most of his time to research and development on saran resins and latexes.

Mr. Henson is also the author of several articles on latex paints and holds two patents in this field. He is a member of the American Chemical Society.

Mr. Quigley began his career with Dow in 1946. He worked on organic synthesis for a year and has been on the Coatings Technical Service staff since it was formed in 1947. He is a member of the American Association of Textile Chemists and Colorists.

•

N. Y. Paint Firm Appoints Reps. For Midwest & Rocky Mt. States

The Landers-Segal Color Company, Brooklyn, N. Y., has appointed the Robert E. Quick Company of Denver, Colo., as their sales representatives for Colorado, Wyoming, Montana, Utah, Idaho, Arizona, and New Mexico. Quick will handle Landers-Segal's Line of dry colors, flushed colors and water dispersions to the paint and allied industries.

Landers-Segal has also announced the appointment of the Midwestern Sales Company of Kansas City, Missouri as sales representatives for Missouri, Kansas, Iowa, South Dakota, Oklahoma, Arkansas, and Nebraska.

Floyd M. Reece, former Pres. Of O'Brien Corporation, Dies

Floyd M. Reece, former president of the O'Brien Corporation, South Bend, Ind., died recently in South Bend, after an illness of several months. Mr. Reece was primarily responsible for the O'Brien patented process for preshrinking oils. He began his career with O'Brien in 1903, and in the years following, held every technical and production job in the company, culminating with his appointment as president of the firm in 1944, upon the death of Mr. George L. O'Brien. He resigned as president in 1947, devoting his time to research work in the company laboratories.

F. M. Reece

Mr. Reece was a member of the Fifty Year Club of the National Paint, Varnish and Lacquer Association.

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Du Pont To Cease Production And Sale of Lithopone Pigments

The manufacture and sale of lithopone pigments will be discontinued by the Du Pont Company at the end of February, 1954, the company announced recently.

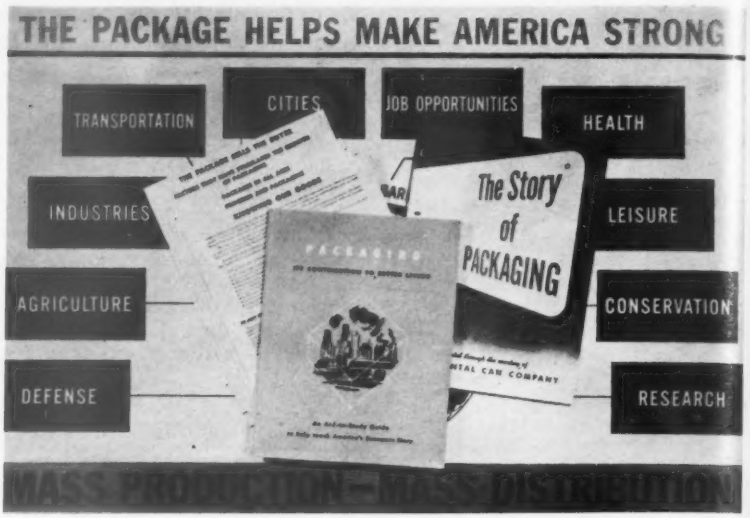
Steadily declining demand for lithopone, which has largely been superseded by titanium dioxide—a whiter white pigment for most paints, prompted Du Pont's decision to cease production gradually as raw materials on hand are consumed, the Du Pont release said.

The closing down of lithopone production has been planned to correspond with an expansion of titanium pigment production with the result that the transition is expected to be made without any layoffs., the release added.

•

Synvar Corporation Appoints N. J. Firm as Resin Coating Rep.

The Synvar Corporation, Wilmington, Del., has announced the appointment of the W. R. Husen Company, East Orange, N. J. as their special representative to promote the sale of Synvar's industrial type resins in diversified fields including the protective coating and printing ink industries.



Color wall-chest describing Continental Can Co. teacher's guide book.

Economic Development of America Described in Can Firm's Guidebook

A 63-page teacher's guidebook entitled, "Packaging, Its Contribution to Better Living," designed to provide school teachers with an instruction aid to give their students a better understanding of America's economic system and standard of living, has been introduced by the Continental Can Company, New York, N. Y., in schools located in the firm's plant cities.

The guidebook, basis of Continental Can's three-part education program to teach America's economic story through a study of the packaging industry, does not suggest additional units of study but points up ways of vitalizing units that are already being taught at all grade levels—lower elementary through Senior High School.

Accompanying the guidebook are six wall charts, in full color, suitable for classroom use, and a 15-minute, animated film, "The Story of Packaging," which traces the development of the packaging industry in this country from the days of the Pilgrims to the present time.

Since last February, when distribution of the materials began, almost 15,000 sets of the guidebook and charts have been requested by superintendents, principals and teachers in plant city schools. The film is available separately on a free loan basis from local plant managers.

The initial distribution represents acceptance of the program by school heads in almost 100 per cent of Continental Can's plant cities, according to a firm release.

Shell Says New Technique Reduces Alkyd Resins in Odorless Thinner

A new technique to facilitate reduction of otherwise incompatible alkyd resins in odorless thinner will be displayed and explained by the Shell Oil Company at the Paint Industries Show to be held Oct. 27-30, in Atlantic City, N. J.

According to Shell technicians, the method solves one of the most difficult problems faced by the paint and resin industries: retaining the highest quality in the alkyds for odorless paints with improved shelf life, yet making no sacrifice in odor, solids content, or other features of the film.

Named the Shell Alkyd Reduction Technique (U.S. Patent pending), it was developed on the basis of an odorless thinner produced by Shell.

Shell experts say that the results of the study indicate that the discovery has immediate and long-range potentialities.

Koppers Co. Constructs Plastics Development Plant at Kobuta, Pa.

Construction of a plastics development plant at the site of the large Kobuta chemical plant of Koppers Company, Inc., was announced recently.

According to Dan M. Rugg, vice president and general manager of Koppers' Chemical Division, the new facilities will produce semi-commercial quantities of a wide variety of new plastics.

•

American Cyanamid To Construct Titanium Pigment Plant in Ga.

A titanium dioxide pigment plant will be constructed for the American Cyanamid Company at Savannah, Ga., by the Chemical Construction Corporation. a subsidiary of American Cyanamid.

The plant will be operated by American Cyanamid's Calco Chemical Division.

NEWS DIGEST

Walter F. Platt, Jr., ADM Vice President of Eastern Sales, Dies

Walter F. Platt, Jr., Vice President in charge of Eastern Sales for the Archer - Daniels-Midland Company, Minneapolis, Minn., died September 27, following six months' illness. He was 54. Mr. Platt, associated with Archer-Daniels-Midland since 1928, entered the linseed oil industry in 1915, as an office-boy in the New York office of the American Linseed Company. Following a series of promotions, he became general sales manager of American's linseed oil department in 1928.

W. F. Platt Jr.

When the American Linseed Company became a part of ADM in 1928, Mr. Platt remained in the New York office as assistant manager of eastern sales. He was elected an assistant vice president in 1948, and a vice president three years later.

•

Cowles Appoints N. England and Southern Sales Representatives

The Cowles Company, Inc., Cayuga, New York, has appointed George E. Missbach & Company, Atlanta, Ga., as their representative in several southern States, and The Truesdale Company, Allston, Mass., representative in the New England States.

Both distributers have been granted exclusive franchises for Cowles' Ultrafast Dissolver.

Misbach and Company will cover North and South Carolina, Florida, Georgia, Alabama, Tennessee and Mississippi.

•

Koppers To Add New building at Verona Research Center in Pa.

Koppers Company, Inc., Pittsburgh, Pa., announced recently it had purchased about two acres of land directly east of its Research Center at Verona, Pa., and will start immediately to erect additional research facilities, primarily for its Tar Products Division.

The research facilities will be housed in a one-story building, approximately 80 by 160 feet. The building will be completed by late spring of next year.

New York Production Club Executive Committee for 1954. Back row, left to right: Francis Rogers, Herbert Hillman, Ernest S. Paterno (Treasurer), William Greco. Front row, L. to R.: Irving Flaumenhaft (Secretary), John Congleton (Vice President), E. Dale Albert (Past President), W. E. Santore (President). Absent were Anthony Skett and Benjamin Chatzinoff.

Western Plant Maintenance Show Scheduled in Los Angeles, Calif.

Plans for the West Coast's first Plant Maintenance Show were announced recently by Clapp & Poliak, Inc., who will produce the show, and a board of leading western industrialists, sponsoring the event.

Scheduled for the Pan Pacific Auditorium in Los Angeles, July 13-15, 1954, the Show will be held concurrently with a Plant Maintenance Conference, directed by L. C. Morrow, consulting editor, Factory Management & Maintenance.

The western show is to be modeled after the Plant Maintenance Shows which Clapp & Poliak, Inc. have produced in major eastern industrial centers during the past five years.

It will underscore the specialized problems of maintenance and engineering faced by western industry which has undergone tremendous expansion since World War II.

The Show's board of sponsors is composed of executives from 18 major firms in the west and eastern companies who conduct large activities on the West Coast.

•

Allied Chemical Purchases Libbey-Owens' Plaskon Division

Arrangements have been completed for the cash purchase of the Plaskon Division of the Libbey-Owens-Ford Glass Company by the Allied Chemical & Dye Corporation, New York, N. Y., officers of the two companies announced recently.

Allied Chemical plans to operate the Plaskon's facilities as a unit of its Barrett Division.

C. B. Elledge, Vice President of The Material Handling Institute, Inc., speaking at opening meeting of second traveling clinic held October 2, in Boston, Mass. Meeting was held in cooperation with the New England Chapter of the AMHS. Seated left to right: James R. Bright (Modern Materials Handling) Chairman of Committee; George A. Smith, International President of AMHS, and Sears L. Hallet, President of the New England Chapter of AMHS.

Arizona Chemical Realigns Sales Agents at Semi-Annual Meeting

A realignment of sales responsibilities was announced at the semi-annual meeting of the Arizona Chemical Company held in New York City, September 28-30.

In addition to its Acintol tall oil derivatives, Arizona's sales force will now also handle terpene products.

The following sales territory assignments were announced at the meeting:

Albert E. Neil, with headquarters at Panama City, Florida, will have responsibility for sales in Florida, Georgia, South Carolina, Alabama, Tennessee, Oklahoma, Arkansas, Mississippi, Louisiana, Texas and New Mexico.

H. D. Spruance, with headquarters in Chicago, has been assigned Iowa, Minnesota, Wisconsin, Illinois, Missouri, Indiana and Michigan.

R. J. Schadewald, with headquarters in Philadelphia, will handle Pennsylvania, Ohio, Delaware, Kentucky, Maryland, North Carolina, Virginia, West Virginia and the District of Columbia.

Thomas F. White, headquartered in New York City, will handle New Jersey, New York and the New England states.

Sales of Acintene products in Arizona' California, Washington, and Oregon will be handled by the A. J. Lynch Company, Los Angeles, under the direction of its president, Wess. E. Cadwallader and in San Francisco, under the direction of Herbert G. Pratt. This company will also continue as sales agents for the Acintol line of tall oil products.

The Research and Development Section of Arizona Chemical has been moved to the company's Stamford, Conn., Research Laboratories, and the Technical Service Laboratory at Linden, New Jersey, has been enlarged.

Arizona Chemical is jointly owned by the American Cyanamid Company, New York, N. Y., and the International Paper Company.

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L. Martin Company, Inc. Moves Its New York City Headquarters

The L. Martin Company, Inc., lamp black manufacturers, has moved its New York City headquarters from 41 East 42nd St. to 380 Madison Ave. The telephone number is the same.

Pigment Club Meeting

The next meeting of the New York Pigment Club will be held Thursday evening, November 12, 1953, at 6:30 P. M. The meeting place will again be the Kenmore Hall Hotel, 145 East 23rd Street, New York City. A report will be made by the By-Laws Committee, and a program of interest to all members of the pigment industry is planned.

Vinyl Toluene To Be Discussed at Vehicle Manufacturers' Meeting

The Vehicle Manufacturers' Group of the New York Paint, Varnish and Lacquer Association will hold a meeting November 18, 6:30 p.m. at the Chemists' Club, 52 East 41st Street, New York, N.Y.

Walter A. Henson, Dow Chemical Company, will discuss, "Vinyl Toluene —A New Spoke in the Vehicle Wheel." He will cover the many applications of this new monomer.

Advanced reservations are suggested because of the large turnout expected.

Dr. J. S. Long and C. P. Jarden Receive Heckel Paint Awards

Dr. J. S. Long, chemical director of Devoe and Raynolds Co., and C. P. Jarden, director of Sherwin-Williams were recipients of the 1953 George B. Heckel Paint Industry Awards, presented by J. F. Battley, Pres. of NPVLA on Oct. 29th at the recent convention.

•

J. B. Wiesel Forms Consulting Service for Chemical Industry

J. B. Wiesel, a registered consulting engineer in Delaware, and for 37 years in the chemical and protective coatings industries, has established a Management Consulting Service to the chemical industry with particular reference to protective coatings.

Located at 1001 Overbrook Road, Westover Hills, Wilmington 6, Delaware, Mr. Wiesel's services will include: initiating sales development programs, administrative and sales management studies of individual manufacturers, assistance in planning and conducting sales meetings and conventions and advice on patent questions.

Chicago Paint, Varnish & Lacquer Assoc. Honors Past Presidents

The Chicago Paint, Varnish and Lacquer Association honored its past-presidents at a luncheon held October 14, in the Chicago Athletic Club.

Association President, L. O. Smith presided at the luncheon attended by 13 past presidents and six of the CPVLA's present officers and members of the Executive Committee.

Those in attendance were: Emory S. Rockwell, National Lead Company; F. L. Sulzberger, Enterprise Paint Mfg. Co.; H. A. Melum, Benjamin Moore & Co.; Arthur Dole, Jr., Hooker Glass & Paint Mfg. Co.; W. J. Hough, Central Solvents & Chemicals; H. A. Penney, American Can Company; M. K. Pine, Wesco Waterpaints Div., National Gypsum Co.; E. T. Stille, Stille Young Corp.; H. A. Rowland, Elliott Paint and Varnish Co.; R. O. Clark, Jewel Paint & Varnish; L. S. Guthman, Bradley & Vrooman; H. D. Wright, Tousey Varnish Co.; J. P. Jordan, American-Marietta.

Present officers are: Mr. Smith, President; Clyde C. McInnes, American Mineral Spirits Co., Treasurer; J. P. Sheridan, New Jersey Zinc Sales Co., Executive Committee; Claude Harris, Sherwin-Williams Co., Executive Committee; E. F. O'Toole, England & O'Toole, Counsel; R. J. Vonesh, Chicago Paint, Varnish & Lacquer Association, Executive Secretary.

Chicago Paint, Varnish and Lacquer Association Past-President luncheon.

(*From page 30*)

3. Be constantly alert to developments which will affect future production and sales so that markets will not remain undeveloped.

"In this job of realizing the potentials of future America, the Federal government also has a responsibility. Nothing connected with this responsibility is more important than providing free enterprise the freedom in which to operate. This means assuring an economic climate in which it is possible for the individual and business to plan ahead, to realize the rewards of initiative and work, and to know that all these efforts will not be washed out by a mercurial dollar that tomorrow may be worth only fifty cents.

"I believe the Administration's team in Washington has indicated by deed as well as by word that you can count on progressive improvement in the climate for free enterprise. Let me recount briefly some of the barometer readings for such a climate:

1. The Government is withdrawing from competition with free enterprise. Secretary Weeks, for example, has sold the Federal Barge Lines and it is now under private management. Secretary McKay has made it clear that he does not conceive the mission of the Department of Interior to be one of the extending the domain of public power for the sake of public power.

2. Wage and price controls have been scrapped. The same is true for the bulk of materials controls.

3. Inflation has been sharply checked. Consumer price indices show that you can buy almost exactly as much with the dollar today as a year ago. We are getting back to the honest dollar again. It should remove many of the uncertainties that beset business in planning ahead.

4. Great efforts are being made to keep the dollar honest and its value from depreciating. A governmental deficit of $9.9 billions for the year ending June 30, 1954, had been projected. A careful pruning job by this Administration has reduced this prospective deficit to $3.8 billions. This matter of balancing the budget is not a simple overnight task in spite of all diligence and restraint. A principal reason is that the new team in Washington has had to cope with an inheritance of $81 billions of future obligations and commitments.

5. An ultimate object of this reduction of government expenditures is to get in a position where taxes can be in good conscience reduced and the whole tax system be given an overhaul. There are at least two reasons for this. One is that taxes are too substantial a part of the consumer's living costs—reduced taxes mean more money for the consumer to spend as he wants rather than as the government decides to spend it for him. I am sure you would rather compete for the consumer's dollar than the government's dollar. The second reason rests not only on the amount of taxes but in the way they are imposed. I refer to their stifling effect on incentive. If we don't give the individual and the businessman every reasonable incentive to invest, to use his ingenuity and labor to produce, we won't have an economic system worth defending.

6. Finally, there is the truce in Korea.

"All these things I have mentioned are essential, I firmly believe, to an economic climate in which management and the worker stand to benefit in direct proportion to their initiative and effort, and furthermore can do so with dignity and freedom."

James A. McConnell

James A. McConnell is executive vice president of the Cooperative Grange League Federation Exchange. In this talk on, "An Appraisal of Our Free Enterprise System" he made the following significant remarks:

"There are three strongholds or Bastions which are necessary for the existence of a free enterprise system and all are lost and must be recaptured if we are not to become a predominantly Socialistic State.

"It has been pointed out by a prominent Australian economist that when a country's tax rate takes more than 25 per cent of the national income as a permanent policy, Socialism in the modern sense is inevitable. Confiscatory taxes to take care of an emergency such as war, yes, but as a permanent way of life, it's completely incompatible with free enterprise. I have no patience with the argument that it's impossible to cut public spending because of the defense budget. I challenge any one to refute this statement. If the leadership of this country—business, farm, labor, and political—had the courage and were firmly committed to a reduction in public spending, then we could reduce public spending substantially and immediately, and still maintain as adequate a defense against Russia as is practical.

"There is a second bastion which a nation must have if it is to remain free, and that is freedom of the market place. Since 1942, our economy has been under price and wage ceilings more years than not. The OPA was in effect from the Fall of 1941 to the Fall of 1946, five years. The OPS was in effect from the Fall of 1950 to the Spring of 1953. Prices and wages have been under direct control by Government almost two-thirds of the time during the last 12 years.

"At the present time, supports on farm crops, mandated by Congress on a rigid 90 per cent basis of parity, are in process of destroying the free markets for our food commodities. The food business—production, processing, and distribution—is about one-third of our total economy.

"Someone may say that we are rid of price ceilings now. Don't fool yourself. Price ceilings are closely tied up with price supports. The principle of price ceilings to control inflation is firmly imbedded in the minds and consciousness of millions of people in this country today, in spite of the fact that it is sheer sophistry. They can and may be put on by Congress at the slightest excuse because the understanding of a free competitive system no longer exists. Price and wage ceilings and supports under farm products that interfere with supply and demand, are a negation of free markets and, if persisted in, will destroy one of our basic freedoms.

"The third bastion is freedom from legalized monopolies. The best example we have today of this is Labor Unions. Protected and encouraged under partisan laws, passed by a partisan Congress, sustained by the decisions of a New Deal Supreme Court, we have a labor monopoly in this country which today is very real and very powerful. A free competitive system cannot long be maintained alongside of powerful monopolies operating under legal protection.

"Freedom from confiscatory taxes, free markets, and freedom from legalized monopolies are the three freedoms upon which all other freedoms depend"

Industrial Product Finishes Div.

One of the most interesting sessions of this particular convention was the 20th Anniversary Program of the Industrial Product Finishes Division. This program was presided by Joseph A. Hager, chairman of the Industrial Product Finishes Steering Committee. Speakers at this session included W. I. Longsworth, J. A. Hager and L. S. Guthman.

Mr. Longworth's talk dealt with "The Inception and Birth of the Industrial Product Finishes Division". He traced the factors which brought about the organization of the National Paint, Varnish and Lacquer Association which led to the formation of the Industrial Production Division within the framework of the National Association.

He credits Joe Esposito for his untiring efforts and hard work in organizing manufacturers of industrial finishes, which was recognized by the newly formed Association in 1933 and called

the National Industrial Sales Committee.

Mr. Hager summed up the growth, development, and accomplishments of the Industrial Product Finishes Division from 1933 to 1953. He pointed out that in the early days of the Division, and its Steering Committee, there was great distrust between men in the Division. He said, "They were rugged individualists who proved it by wanting no part of cooperative effort, and who felt perfectly able to paddle their own canoe without any help whatsoever, or as they looked upon it, any interference from the outside. Well, for the Committee and the Division, to accomplish anything at all, it was first necessary to displace this distrust with mutual trust. It was necessary to convert the rugged individualist into a team player. It was necessary to replace a short-sighted selfish philosophy with a broad minded concept of the responsibilities of the industry.

"All about you is evidence of the success that attended the Committee's efforts in this regard. Today we hold other manufacturers and members of our industry in high regard. We know them to be trustworthy, to be friends, to be sincere in their efforts to faithfully and efficiently discharge their responsibilities, to be ever ready to lend a helping hand, and to share their knowledge and talents for the good of industry, or its individual members."

Mr. Guthman in discussing The Future for the Industrial Product Finishes Division stressed the importance of new technological developments which have offered improvement in the various physical and chemical properties of finishes. Among those developments he mentioned the possibility of employing materials at 100% solids, vehicles using water as a carrier, and the use of trifluoromonochloroethylene resins in a dispersion-type system, fire-retardant finishes, finishes based on sugar derivatives.

He also pointed out the intensive work which is currently being done in the development of finishes for the jet type of military aircraft and discussed the many problems encountered with finishes for jet planes.

Mr. Guthman also devoted much attention to advancements in application equipment for industrial finishes such as automatic spraying, electrostatic spraying, high pressure spraying, etc.

Some thought was also given to the future of finishes in light of increased use of plastics, metal alloys with bright colors, and institutional approaches of employing porcelain as a decorative and protective finish.

Trade Sales Forum

One of the highlights of this 65th convention was the Trade Sales Manufacturers' Forum.

A. A. Shuger, Chairman of this particular group gave an interesting commentary on the "Do-It-Yourself-Market." He pointed out that this market, if exploited to its fullest extent, will mean an increase of at least 25 percent in trade sale products.

However, he sounded this note of warning regarding the "Do-It-Yourself-Market."

He said that big chain organizations such as supermarkets, drug chains, etc. are considering entering the paint business.

Mr. Shuger said that these big chains obey no law except their own appetites and this power sooner or later will be felt with only large paint manufacturers benefitting from the situation, and urged that considerable thought and effort be given toward the protection of the paint jobber.

A film series used in a TV test campaign featuring Norman Brokenshire was chosen for the test campaign. These included Columbus, Ohio, Dallas, Texas, Syracuse, N. Y., New Haven, Conn., Richmond, Va., and Minneapolis-St. Paul.

Lucien C. Rondot of *Fact Finder Associates, Inc.* reported on a survey regarding paint promotion among 1500 consumers, 151 dealers and 222 painting contractors. The results of test cities to date indicate the promotion is most favorable, according to Mr. Rondot.

An interesting survey on National Consumer painting habits was presented by *Howard A. Trumbull*, president of *National Family Opinion, Inc.*

He devoted a considerable part of his talk on how the survey was being conducted and the questions asked. Although tabulations are not complete, Mr. Trumbull gave the audience some preliminary figures on who in the family does the painting both interior and exterior. He drew one conclusion from these figures in that women (mom and daughter) are doing more painting, especially on interior surfaces.

Other forums included Advertising and Sales Promotion Managers' Discussion Forum, Putty Manufacturers' Forum, Caulking Compound Manufacturers' Forum, Roof Coating and Roof Cement Manufacturers' Forum and Industrial Product Finishes Manufacturers' Forum.

The annual meeting of the Wholesale-Distributions Division was highlighted with talks on, "The Wholesaler—As a Paint Jobber"—William M. Stuart, Recent Developments in the Paint Industry by John C. Moore, Storage of Paint by Francis Scofield and Efficient Warehousing Operation by J. Wm. Johnston.

31st ANNUAL MEETING

(*From page 62*)

Dr. W. O. Lundberg reported on the Evaluation Committee of the Federation regarding the project on film deterioration of drying oils. He said that this study involved twenty-three projects and in many instances required special equipment and material. He paid particular tribute to those taking part in this project such as certain constituent clubs, universities, and firms. Cost of this study was about $100,000.

Calculation and evaluation of to date from this study are now being conducted and it is expected that a final report will appear in the *Official Digest* sometime next Spring.

Paint Industries' Show

This year's Paint Industries' Show attracted a record crowd. It was estimated that close to 2,000 production men, plant superintendents, chemists, technical directors were in attendance.

Some seventy-seven firms exhibited their products with 12 firms participating in one exhibit featuring the latest in lacquer formulation, technology and application.

With many new raw materials being introduced to the paint industry for the first time, exhibitors were kept busy providing data and information to the prospective buyers who were on hand.

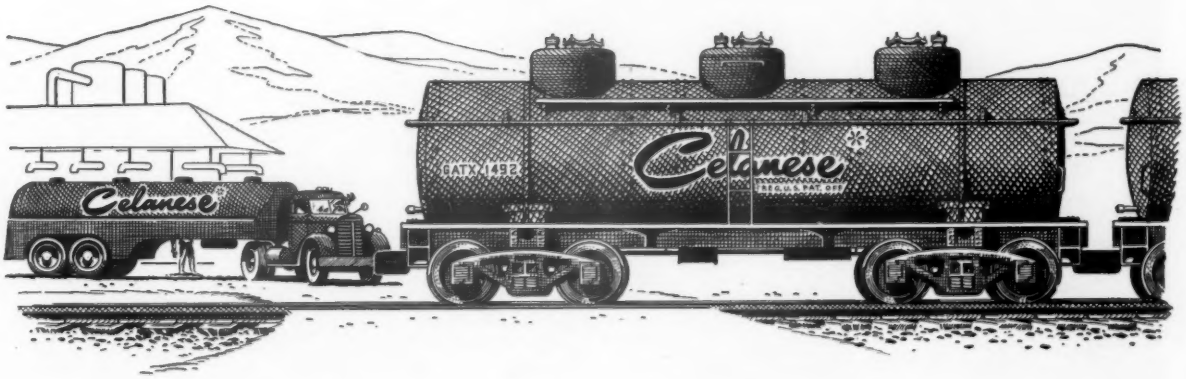
Important new developments in raw materials which were made available to the paint industry consisted of the following: vinyl acetate resin latex; vinyl resin that is compatible with heat-reactive resins and has application in coatings to be roller-coated or sprayed onto sheet iron or tin plate; polyvinyl acetate emulsion for primer sealers (exterior and interior); melamine resin for baking enamels in conjunction with alkyd resins; heat-reactive resins for coatings to resist chemicals and heat together with tough mar-resistance and good adhesion; rosin-modified alkyd resin which is alcohol soluble, compatible with nitrocellulose, and recommended in the formulation of printing inks, and lacquer for asphalt tile and wood sealers; heat reactive resin of the hydrocarbon type that does not darken on exposure to ultra-violet light and recommended for manufacturing vehicles and varnishes; technique for forming a hydrocarbon resin emulsion; epoxy resin and soybean fatty acid combination for white baking enamels and air dry enamels; epoxy-rosin varnish type resins for baking enamels; polymerized linseed oil for exterior paints; tall oil-dehy-

(*Turn to page 84*)

Inventory Streamliner...

Combination shipments of Celanese* Solvents and Plasticizers answer many inventory problems. Compartmented tankcar and compartmented tank-wagon orders can hold your inventories of solvents and plasticizers to an immediate-use level . . . ease the storage situation . . . and still give you the economy of tankcar prices. For complete information about Celanese combination shipments, call your nearest Celanese sales office or write:

Celanese Corporation of America,
Chemical Division, Dept. 558-K
180 Madison Avenue, New York 16, N. Y.



CELANESE* SOLVENTS

Acetone
n-Butanol
Isobutanol
Methanol
n-Propanol
n-Butyl Acetate
n-Propyl Acetate
Butylene Glycols
Dipropylene Glycol
Propylene Glycol
Celanese Solvent 203
Celanese Solvent 301
Celanese Solvent 601
Celanese Solvent 901H

CELANESE* PLASTICIZERS

LINDOL*
Tricresyl Phosphate

CELLUFLEX* 179C
Tricresyl Phosphate

CELLUFLEX* 112
Mixed ester

CELLUFLEX* TPP
Triphenyl Phosphate

CELLUFLEX* DBP
Dibutyl phthalate

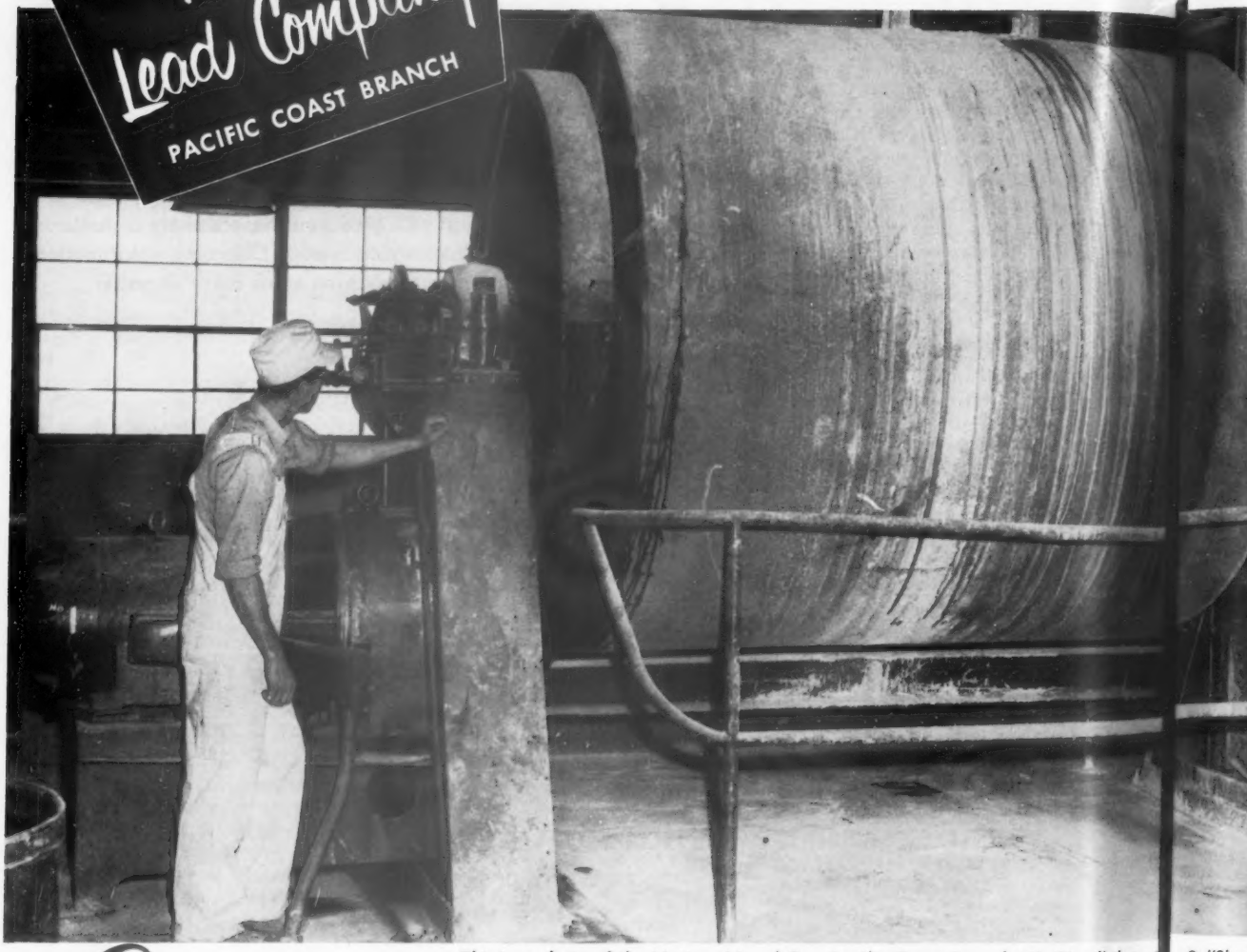
CELLUFLEX* DOP
Dioctyl phthalate

Celanese CHEMICALS

*Reg. U. S. Pat. Off.

NOW GETS A 6+ N.S.

National Lead Company
PACIFIC COAST BRANCH

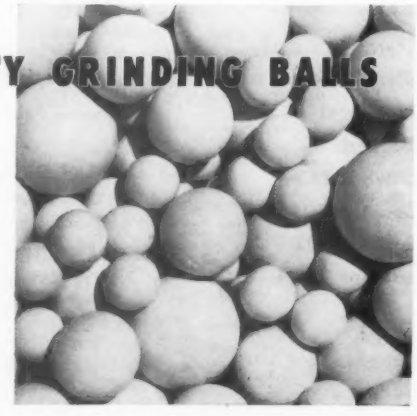


This is a photo of the National Lead Co., Pacific Coast Branch, 6'x 7' mill that get a 6+ N.S. grind in 18 hours at 14 r.p.m.— by using COORS High Density Grinding Balls

Coors

By test the best **HIGH DENSITY GRINDING BALLS**

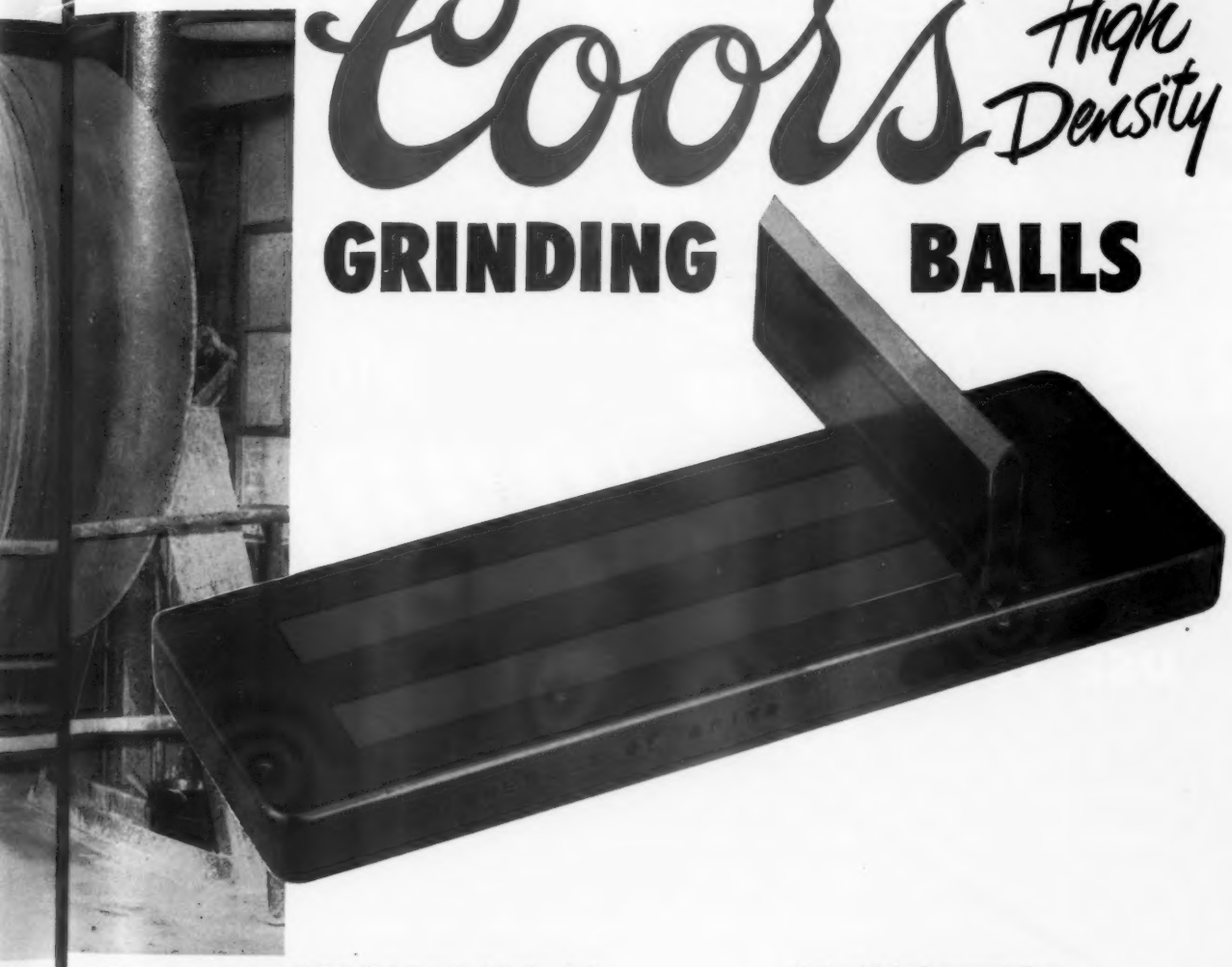
- **High Density — Faster Dispersion**
- **Tough Ceramic — Minimum Wear**
- **Pure White — No Color Contamination**
- **Smooth Surfaces — Easy Cleaning**
- **High Strength — No Chipping or Cracking**



COORS PORCELAIN COMPANY
Golden, Colorado

N.S. GRIND IN 18 HOURS WITH

Coors High Density GRINDING BALLS



• "Since charging with COORS High Density Grinding Balls, it has been possible here at National Lead Co. to get grinds up to and including 7 N.S. within a 24-hour grinding period. We use the Low Solids Grinding technique; loading the mill to 55-60% of volume, combined balls and paste; and operating at a consistency of 100 to 120 KU.

"Initially this 6'x 7' mill was driven at 18.6 r.p.m. A certain amount of chipping of the balls resulted. Nevertheless, it was possible to get a 6+ N.S. grind on a flat paint, containing talc, in 18 hours. To stop the chipping, the mill speed was reduced to 14 r.p.m. The grind standard of 6+ N.S. was still attained in 18 hours, and the chipping stopped."

COORS High Density Grinding Media offers you an economical means of increasing the production capacity of your pebble mills. Also, they are used in steel ball mills, replacing steel balls, to minimize iron contamination.

National Sales Representatives . . .
LZP Industrial Ceramics, 2500 West 7th Ave., Denver 4 Colorado

COORS PORCELAIN COMPANY
c/o LZP Industrial Ceramics
2500 West 7th Ave.,
Denver 4, Colorado.

☐ I would like information and samples of COORS High Density Grinding Balls.

☐ Also, please send information on COORS Natural Shape® High Density Grinding Media.

Name_____ Title_____

Company_____

Address_____

City & State_____

MR. PAINT FORMULATOR

Step Up Production with Marbon "9200"

Soluble High Styrene Paint Resins

USE THE SPECIFIC RESIN FOR THE SPECIFIC USE!

Marbon "9200" paint resins are made in four different viscosity grades; HV, MV, LV and LLV. Proper choice of the resin eliminates pigment manipulation for proper body and allows maintenance of viscosity at any given solids.

Use Marbon "9200" LLV for spraying and for high-build films; Use MV and LV grades for general purposes; Use HV grade for high body at low solids.

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MARBON . . . Your Buy-Word for Product Perfection

New "FORTIFIED"

ROALOX MILL JARS

Give two to three times the wear life, one-half to one-third the contamination

The new Roalox Mill Jar outwears the best conventional porcelain jars two to three times! Cuts jar replacement in ball and pebble milling two-thirds!—And costs but pennies more than ordinary mill jars!

New Roalox Mill Jars are made of a remarkable ceramic body closely related to Burundum (the high specific grinding medium) in both physical and chemical properties.

This new fortified body reduces silica contamination to a negligible point — not only because it wears far more slowly, but the silica content of the body itself is substantially less.

Combined with wear-resistance three times greater is far higher mechanical strength—breakage hazard is lessened—jar replacement further lowered.

Order a *new* ROALOX MILL JAR—run it side by side with the best conventional porcelain jar you can buy. You'll be amazed at the difference in life.

NO OTHER MILL JAR CAN OFFER SUCH A COMBINATION OF FEATURES

1. Two to three times greater wear life
2. Twice the mechanical strength
3. Easy, positive lid locking
4. Lid and lid-lock an integral unit
5. Extra wide mouth opening
6. Oil-and-solvent-resistant Neoprene gasket

Roalox Mill Jars are made in 8 sizes: ½ pt., ⅓ gal., ½ gal., 1⅓ gal., 2⅓ gal., 3½ gal., 4½ gal., and 6½ gal. Write for Bulletin 270 for full details.

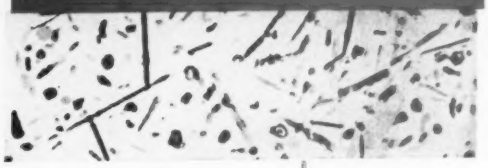
U. S. STONEWARE

Akron 9, Ohio

high

AZO ZZZ-22

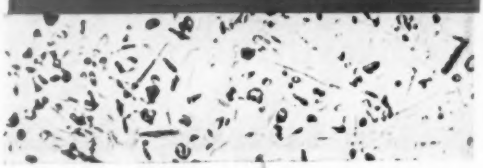
A high oil absorption Zinc Oxide having large Acicular Particles which gives heavy body



medium

AZO ZZZ-11

A medium oil absorption Acicular Zinc Oxide imparting exceptional weathering qualities to exterior paints

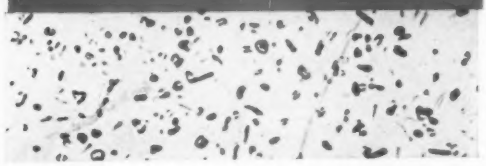


AZO acicular lead-free zinc oxide is a superior pigment available in a wide range of oil absorptions

low

AZO ZZZ-33

A definitely Acicular type with a lower oil absorption, but chemically identical with AZO ZZZ-11 and AZO ZZZ-22



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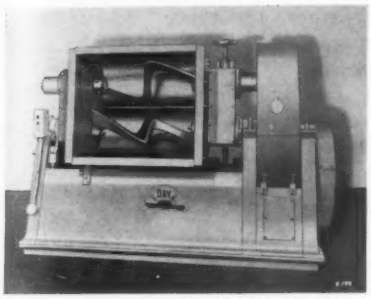
AZO

UNIFORM • DEPENDABLE

NEW MATERIALS & EQUIPMENT

A MONTHLY MARKET SURVEY

This section is to keep readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.



DAY

MIXER

With Air Seal Stuffing Box

Mixer is said to facilitate fast thorough dispersion mixing of heavy plastics and heavy colors in paints and inks, as well as sludge reclamation in paints and enamels. A feature of this mixer, according to the manufacturer, in which counter-rotating agitators travel in 3 to 2 ratio without overlapping, is an air seal stuffing box.

The manufacturer also reports that pneumatic pressure at four to ten pounds protects the product against contamination by lubricants and guards bearings from damage by abrasive mixtures. Carbon dioxide may be substituted for air, or the space in the stuffing box can be packed with grease.

Other innovations claimed are: (1) dumping mechanism, push-button operated in which old-style clutches have been eliminated; (2) heavy duty, barium bronze, self-lubricated bearings; (3) non-weaving bearing supports of heavy ribbed castings, borne on pedestal type supports connected directly to the new heavy duty sub-base; (4) for rigidity, tie bars enclose the base and dump drive mechanism; (5) drive is provided by a 900 rpm motor, which powers the counter shaft by means of a silent chain and sprocket; (6) tank construction employs ¼ inch sheet steel walls for standard tanks and 5/16 inch walls for jacketed tanks, plus heavily ribbed cast iron tank heads; (7) steam jackets (optional) are designed for high pressure up to 125 pounds; (8) plain or vacuum covers have been redesigned to accomodate the new machines.

For full information on this mixer, write to J. H. Day Co., Inc., Dept. 5, Harrison Ave., Cincinnati 22, Ohio.

SEYMOUR

DISPENSING VALVE

For Pressurized Paints

"Purton Clean-O-Matic Valve", designed for dispensing paint from pressurized cans, is equipped with a cleaning rod, automatically cleans itself each time the valve is either opened or closed, thus eliminating clogging under all conditions, according to the manufacturer. The cleaning rod in the valve is activated each time the atomizer spray head is pressed down and break any seal formed in the syphon tube and permits a free flow of the paint. For complete information on this valve, write to Seymour of Sycamore, Inc., Sycamore, Ill.

PAINT ADDITIVE

Retards Rusting

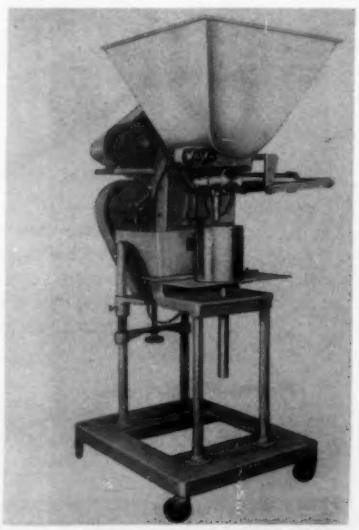
Additive is said to retard rusting when added to a coating material. Even though the coating may become damaged the rusting does not creep, claims the manufacturer. This is accomplished by the development of a tighter bond to the surface being coated. The amount required is 0.75 to 1.00 percent of the total solids of the coating. This product is known as Raybo 85-Rustib. Raybo Chemical Co., Huntington, W. Va.

FILLING MACHINE

For Varied Materials

Semi-automatic filling machine fills chemicals, paints, semi-liquid products into all types of containers including tubes, says the manufacturer. Fills between 15 and 55 containers per minute depending on product and size of containers to be filled. It is reported that this unit may be cleaned easily and changed over quickly to different products and containers. Constructed of stainless steel and monel metal. The Filler Machine Co., Inc., Philmont Club Station, Pa.

FILLER



NEW MATERIALS — EQUIPMENT

TINTING BLACK
With Anionic Agent

Tinting Black "D" rounds out the Black Shield Tinting Back "Trio": #1103-NF with nonionic agent, #1103-Special with cationic agent, Tinting Black "D" with anionic agent. According to the manufacturer, laboratory experiments have revealed that the performance of a tinting black depends largely upon the electrical charge of the pigment particles. Thus the "Trio" was formulated to give maximum strength and minimum flooding for most tinting requirements. The nature of the white base will determine which of these tinting blacks will give best results. Carbon Dispersions, Inc., 27 Haynes Ave., Newark 5, N. J.

SILICONE-ALKYD
Acid-Modified

Coatings based on XR-807, a silicone-alkyd resin, may be air-dried or baked. According to the manufacturer, air dried coatings, are superior in weather and sunlight resistance to any conventional organic finish; baking brings out the high order of heat resistance characteristic of silicone-based paints.

This resin may be pigmented in the conventional manner or used as a clear varnish. It is claimed that alkyd spar varnishes formulated with it show greatly improved weathering properties. May be blended with urea or melamine formaldehyde resins.

Paints formulated with XR-807 have been in service on buildings, distillation towers and tanks of the Dow Corning plant for over 2 years without losing gloss or color intensity. In other applications, test coatings have maintained excellent film integrity, adhesion and weather resistance despite prolonged exposure to surface temperatures as high as 750 deg. F.

For complete details on this resin, write to Dow Corning Corp., Midland, Mich.

POLYAMIDE RESINS
Various Uses

Three polyamide-type resins suitable for both solvent and hot-melt application in decorative, greaseproof, waterproof, heat-sealing and water-vapor-proof coatings are available.

Known as "Nopcote", these resins range from soft and tacky to hard and brittle materials. They are designated by their softening points (degrees Centigrade): Nopcote 45, 105 and 190. According to the producer, these resins are resistant to strong alkalis, mild acids and hydrocarbon solvents.

These resins can be blended with rosin and rosin derivatives, phenolic and maleic resins, cellulose nitrate and small amounts of paraffin wax. Primary solvents for these resins consist of higher alcohols, and aliphatic and aromatic hydrocarbons are used as diluents. Nopco Chemical Co., Harrison, N. J.

POROSITY DETECTOR
May Be Used for Non-conductors

Type PR porosity detector has been designed to provide a simple, positive and effective means for detecting porosity in any dielectric material up to one-eighth of an inch in thickness, according to the claims of the manufacturer. It is reported that this instrument has a special circuitry which eliminates the personnel hazard associated with high potential equipment. For complete details, write to Viking Instruments, Inc., East Haddam, Conn.

Write today for free literature on Syloid AL-1—prevents pressure build-up in metallic paints—and Syloid 162—alkyd-urea varnish flatting agent. Booklets include chemical and physical properties, use data and information on laboratory and field tests.

Progress Through Chemistry

THE DAVISON CHEMICAL CORPORATION

Baltimore 3, Maryland

PRODUCERS OF: CATALYSTS, INORGANIC ACIDS, SUPERPHOSPHATES, PHOSPHATE ROCK, SILICA GELS, AND SILICOFLUORIDES. SOLE PRODUCERS OF DAVCO® GRANULATED FERTILIZERS.

CHEMICALS ACP PROCESSES

PHOSPHATE COATINGS TO MAKE YOUR PRODUCT DURABLE*

PIONEERING RESEARCH AND DEVELOPMENT SINCE 1914

For more than a third of a century, ACP research chemists and ACP technical representatives in the field have pioneered in the science of metal preservation. They have developed surface treating chemicals which either protect metals directly, or create a superior bond for decorative and protective paint finishes, and now, ACP chemicals and processes are being used the world around to reduce costs, speed production and add to the life-span of countless products.

ACP metal protective chemicals include: protective coating chemicals for steel, zinc and aluminum; metal cleaners and rust removers; final rinse controls; pickling acid inhibitors; copper coating chemicals; soldering fluxes; alkali cleaners and addition agents; copper stripping and brightening solutions.

PAINT BONDING

"GRANODINE"® zinc phosphate coatings improve paint adhesion on automobiles, refrigerators, projectiles, rockets, and many other steel and iron fabricated units or components.

"LITHOFORM"® zinc phosphate coatings, make paint stick to galvanized iron and other zinc and cadmium surfaces.

"ALODINE"® protective coatings provide improved paint adhesion and high corrosion-resistance for aircraft and aircraft parts, awnings, wall tile, signs, bazookas, and many other products made of aluminum.

RUST PROOFING

"PERMADINE"® zinc phosphate coatings provide rust and corrosion proofing for nuts, bolts, screws, hardware, tools, guns, cartridge clips, and many other industrial and ordnance items.

PROTECTION FOR FRICTION SURFACES

"THERMOIL GRANODINE"® manganese-iron phosphate coatings provide both rust proofing and wear resistance — anti-galling, safe break-in, friction on rubbing parts.

IMPROVED DRAWING AND COLD FORMING

"GRANODRAW"® zinc phosphate coatings make possible improved drawing, cold forming and extrusion on such steel products as sheets for stamping, bumpers, parts to be formed, prior to plating or painting, cartridge cases, etc.

*Made, Sold, and Serviced By A Pioneer In Protective Coatings For Metals . . .

AMERICAN CHEMICAL PAINT COMPANY

***General Offices:* Ambler, Penna.**

Detroit, Michigan ***Niles, California*** ***Windsor, Ontario***

ROCO·SOL 3340

Roco-Sol semi-odorless is a high quality product of the new modern Roosevelt Refinery. Thorough tests of odorless paints made with Roco-Sol solvent prove that they are completely acceptable to the consumer. Roco-Sol 3340 is today being used successfully by one of the nation's largest resin manufacturers. It is especially recommended for paints requiring a longer wet edge and slower drying characteristics. Roco-Sol 3340 is in constant supply . . . always available for quick assured tank car or transport delivery.

SOL 3340

WRITE TODAY FOR FREE SAMPLE OF ROCO-SOL 3340

Mr. Paint Manufacturer, if you are looking for a solvent that will give you the same high quality paint that you are now making and you are interested in 42% solvent savings, contact us today.

SPECIFICATIONS: ROCO-SOL 3340

Initial Boiling Point	345° F.
End Point	405° F.
Kauri Butanol Number	31

ROOSEVELT

OIL & REFINING CORPORATION

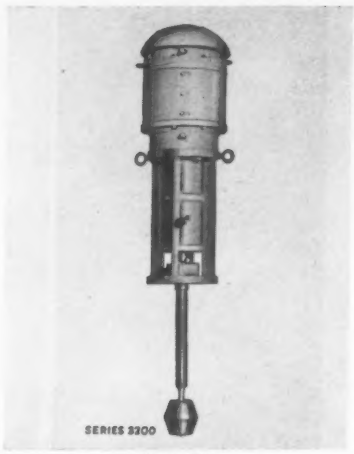
MT. PLEASANT, MICHIGAN

53

NEW MATERIALS — EQUIPMENT

DISPERSING UNITS
For 30-300 Gal. Batch

Known as the "Dispersator" drive units, two types are offered; series 2400 is recommended for beam or channel mounting with opened tanks, and the series 3200 for flange mounting-sealed system operation. According to the manufacturer, these units are designed to operate in the 30-300 gallon range. Other features claimed include flexible motor couplings, sealed-for-life bearings, sturdily welded (or cast) support frames.



PREMIER

The shaft in the 2400 unit is readily demountable by loosening the chuck; the 3200 shaft is fixed, since alignment at a mechanical seal is often required. These units will be of specific interest in the following ranges: 250 cps—100-600 gals., 1000 cps—50-250 gals., 5000 cps—15-100 gals. For complete details, write to Premier Mill Corp., Geneva, N. Y.

LABLINE

ELECTRIC TIMER
Two Models

Electric timer has the following features, according to the manufacturer: counter has quadruple bearings for longer life; motor has double starting torque to give instant pick-up for accuracy; built-in brake gives instant stop; start and stop switch rated 10 amperes. Available in two models, seconds and tenths—minutes and hundredths. Labline, Inc., 217-221 N. Desplaines St., Chicago 6, Ill.

SILICONE-ALKYD RESIN
For Use in Outdoor Paints

Known as Resin XR-807, vehicle is recommended by manufacturer in formulating paints and varnishes for general outdoor application. Modified silicone-alkyd resin is claimed by manufacturer to have superior color stability and gloss retention, plus exceptional resistance to weathering. Product is also designed to improve the chalking characteristics, and to increase the life of paints made with conventional organic resins.

Resin XR-807 is said to be compatable with most short to medium-long oil modified alkyds, reactive and non-reactive phenolics, urea formaldehyde, melamine formaldehyde, traizine formaldehyde, coumarone, chlorinated diphenyls, ester gum, tung oil, and styrenated alkyds. Dow Corning Corporation, Midland, Mich.

Having trouble with a SEEDY BATCH?

• Every now and then a bad batch will go through. Maybe agglomerates were caused by faulty raw materials, or improper setting of the grind. Sometimes a run is contaminated by dirt or other foreign matter.

There's no need to throw that batch away—or ship it and hurt your reputation. You can salvage seedy batches by running them through a Cuno MICRO-KLEAN filter.

Here's what MICRO-KLEAN does for you:

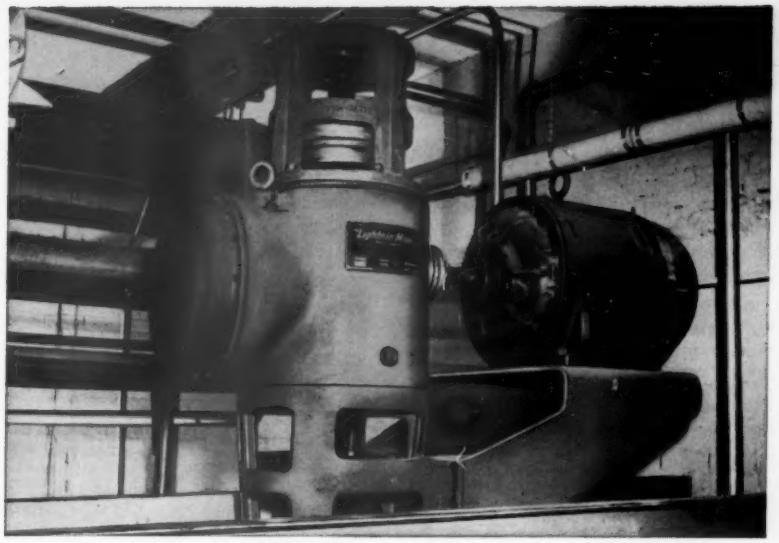
• gives positive removal of all over-size pigments and contaminants.

• provides greater filter capacity for uninterrupted running of larger batches.

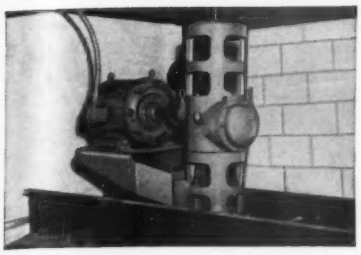
• handles #5 grind and up, removing seeds and particles not touched by a centrifuge.

Find out today how the economical, easily installed MICRO-KLEAN can save you money. Write to Cuno Engineering Corp., Dept. 2812-M Meriden, Conn. M.3.12

CUNO ENGINEERED FILTRATION



THIS LIGHTNIN 10-HP MIXER permits thinning large batches of varnish bases within a few minutes after cooking end point is reached. Unit is installed in 4,000-gallon tank at Pratt & Lambert, Inc.



THIS 5-HP UNIT thins alkyd resins at Pratt & Lambert, Inc. in 3,000-gallon batches. Tank and mixer wetted parts are stainless steel to resist corrosion.

What's the secret of HIGH-SPEED THINNING *in profitable varnish production?*

MAINTAINING PIGMENT SUSPENSION in oil stain during filling operation at Pratt & Lambert, Inc. This function is performed with LIGHTNIN air-driven portable mixer, one of thirty models available.

You can thin varnish in big batches safely, with excellent uniformity and no spoilage—if the mixing is right.

Pratt & Lambert, Inc. (Buffalo, N. Y.) performs this critical operation in a 4,000-gallon tank fitted with a LIGHTNIN turbine mixer. Their new thinning process results in substantial cost reductions.

Varnish bases are first processed to an end point in 2,000-gallon quantities in stainless steel kettles, then discharged in a molten state under CO_2 pressure to the thinning tank, which contains a predetermined volume of thinner.

The LIGHTNIN Mixer rapidly disperses the molten base in the thinner, producing a uniform product which is then filtered and either packaged for sale or incorporated in enamels.

Rapid dispersion of the varnish base in the thinning tank is necessary after the end point is reached in the cookers. Mixing must be done quickly to prevent overcooking the latter part of the batch.

This typifies the way LIGHTNIN Mixers help to reduce mixing, tinting and thinning costs while increasing plant productivity. LIGHTNINS are supplied for open and closed tanks, in sizes from ⅛ to 500 HP.

May we show you, without obligation, how a fully-guaranteed LIGHTNIN Mixer installation can help cut *your* production costs? For details, write us today.

Lightnin® Mixers

Get these helpful LIGHTNIN Catalogs

This library of mixing information is yours for the asking. Catalogs contain helpful data on impeller selection; sizing; best type of vessel; valuable installation and operating hints; complete description of LIGHTNIN Mixers.

MIXCO fluid mixing specialists

MIXING EQUIPMENT Co., Inc.

182 Mt. Read Blvd., Rochester 11, N. Y.

In Canada: William & J. G. Greey, Ltd., Toronto 1, Ont.

- ☐ DH-50 Laboratory Mixers
- ☐ B-75 Portable Mixers (electric and air driven)
- ☐ B-102 Top Entering Mixers (turbine and paddle types)
- ☐ B-103 Top Entering Mixers (propeller type)
- ☐ B-104 Side Entering Mixers
- ☐ B-105 Condensed Catalog (complete line)
- ☐ B-107 Mixing Data Sheet

Please send me the catalogs checked at left.

Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____

NEW MATERIALS — EQUIPMENT

HAND TRUCK
For Pail Handling

Hand truck is said to cut pail handling time by as much as 80 percent, and enables one man to pick up, transport, and stack, five, 5-gallon pails in one operation.

Known as the "Pailtruck," this hand truck is designed for handling straight-side or flare-type 5-gallon pails. Cans may be removed from tightly-packed rows and restacked quickly in limited areas. A patented slip-proof device lifts the pails from the side, thus avoiding denting or marring the containers.

PALMER

Construction is of fabricated steel tubing for easy maneuverability. Specifications: over-all length 56"; over-all width, 21"; capacity, 500 lbs.; wheel diameter, 10 x 2.75", and shipping weight 48 lbs.

Two models are available, Model S for straight-side pails and Model F for flare-type pails. Palmer Supplies Co., 8905 Lake Ave., Cleveland, Ohio.

ELWELL-PARKER

FORK TRUCK
2,000 Lbs. Capacity

The "Cargo Scout", an electric-powered 2000-lb capacity fork truck is designed for fast operation in congested areas. Other uses according to the manufacturer include freight car, highway truck loading and unloading, for operation in narrow aisles or on small elevators, and truck terminal transfer and unloading. Elwell-Parkeer Electric Co., 4205 St. Clair Ave., Cleveland 3, Ohio.

EXPERIMENTAL PRODUCT
Available in Test Quantities

Biuret, H-NCONHCONH-, is an experimental product now available in test quantities. Similar to Urea, it can be used in applications where Urea or Melamine are now used.

Biuret is a white crystalline solid which is odorless and which will absorb water to form the hydrate, 5 Biuret:4H-0, but which is only slightly soluble in cold water.

Samples of product may be obtained by writing to: Products Development Department, Nitrogen Division, Allied Chemical and Dye Corporation, 40 Rector St., New York 6, N.Y.

McCLOSKEY

PRESENTS

A FULL LINE OF

PHTHALIC

AND

NON-PHTHALIC

ALKYDS

WRITE FOR SAMPLES AND TECHNICAL INFORMATION

McCLOSKEY VARNISH CO.

PHILADELPHIA • CHICAGO

PORTLAND, ORE. • LOS ANGELES

New Method of Measuring Chemical Reactions in Paint Bases Devised

A new method of measuring chemical conversions which take place in pre-treatments that are used as paint bases for steel surfaces has been devised by the Research Division of New York University's College of Engineering, New York, N. Y.

The new system is expected to aid greatly in assuring production control by controlling the solubility of paint bases, according to Dr. Max Kronstein, who supervises surface technology research at New York University.

He said the organic coating applied over the base will become more durable if the chemical pre-treatment base can be made as insoluble as possible. In practice pre-treatments are applied from water solutions for a contact time of about one to two minutes.

The experiments pointed to a convenient and practical control method in the pre-treating of steel surfaces with metal-phosphate coatings. Applying the phosphate coatings before the paint appreciably increases the bonding characteristics between the paint and the steel.

The new method consists of measuring—through loss of electrical resistance—the transfer of water-soluble matter from the pre-treated surface. The NYU research workers immersed treated steel panels in distilled water whose resistance they previously measured. They then took measurements as frequently as possible during test periods of up to two minutes, since most of the unconverted chemicals quickly dissolve in water.

In the next step, organic coatings were applied to chemically pre-treated bases of various solubilities. The researchers found that under salt-fog exposure, the life of the coating was closely related to the success of the pre-treatment conversion before paint application. In each case, the coatings were produced from the same paint, were applied in the same thickness, and dried under the same conditions.

New York University's paint research laboratories developed the electrographic printing method several years ago for similar tests in a number of coating problems. This system records moisture penetration or the underfilm spread of moisture in organic coatings. It produces permanent records of each phase in testing.

Other work on steel surfaces in NYU's Engineering Research Division has concerned the relation of depth and shape of surface, the thickness of coatings, and the shape of pigmentation to the degree of corrosion protection. These studies have been extended to the behavior of latex house paints.

Latest findings in the pre-treatment conversion were presented to an American Chemical Society divisional meeting in Chicago, September 7, in a paper by Dr. Kronstein and his associates, Philip Hixon and Jack Granowitz. The complete paper will be presented in the December issue of *Paint and Varnish Production.*

•

Allied Chemical's Nitrogen Div. Opens Organic Development Center

"The most startling developments in chemistry in the next few years will be in the organic field, based largely on petroleum derivatives and natural gas," Hugo Riemer, president of the Nitrogen Division of Allied Chemical & Dye Corporation, predicted last month.

Speaking at the opening of the organic development center of the Nitrogen Division at Hopewell, Virginia, Mr. Riemer expressed the view that "although the older inorganic branch of the chemical industry will continue to expand, the rapidly growing field of organic chemistry promises to become equally as large.

The new organic development center, located adjacent to the Division's ammonia laboratory, consists of two buildings which together provide 40,000 square feet of working space. The air-conditioned research and engineering building houses the laboratories and the engineering staff, and the smaller experimental building is for intermediate scale research.

NEVILLE

Now Available

LX-782

An Oxidizing Petroleum Resin

Rock-Bottom Price

7¢ lb.*

*in Drums F.O.B Neville Island, Pa.

Specifications

Melting Point (cube in mercury).....110-130° C
Color (Neville Color Scale).....9-13
Acid Number.....less than 1
Saponification Number.....0
Iodine Number.....130-160

Uses

Fast Drying Aluminum Paints
Drum Paints (other than light colored)
Porch and Deck Paints
Pipe Coating Oils
Metal Primers
Chassis Blacks

LX-782 is a low-cost, oxidizing, heat reactive hydrocarbon resin. Varnishes made by heat reacting LX-782 with drying oils at a temperature of about 550° F have these worthwhile characteristics . . . low cost, fast drying, good light stability, and excellent resistance to acids, alkalis, alcohols, gasoline, grease, water.

Write today for samples

NEVILLE CHEMICAL CO.
PITTSBURGH 25, PA.
Plants at Neville Island, Pa., and Anaheim, Cal.

P-51

Personnel Changes

SHERWIN-WILLIAMS

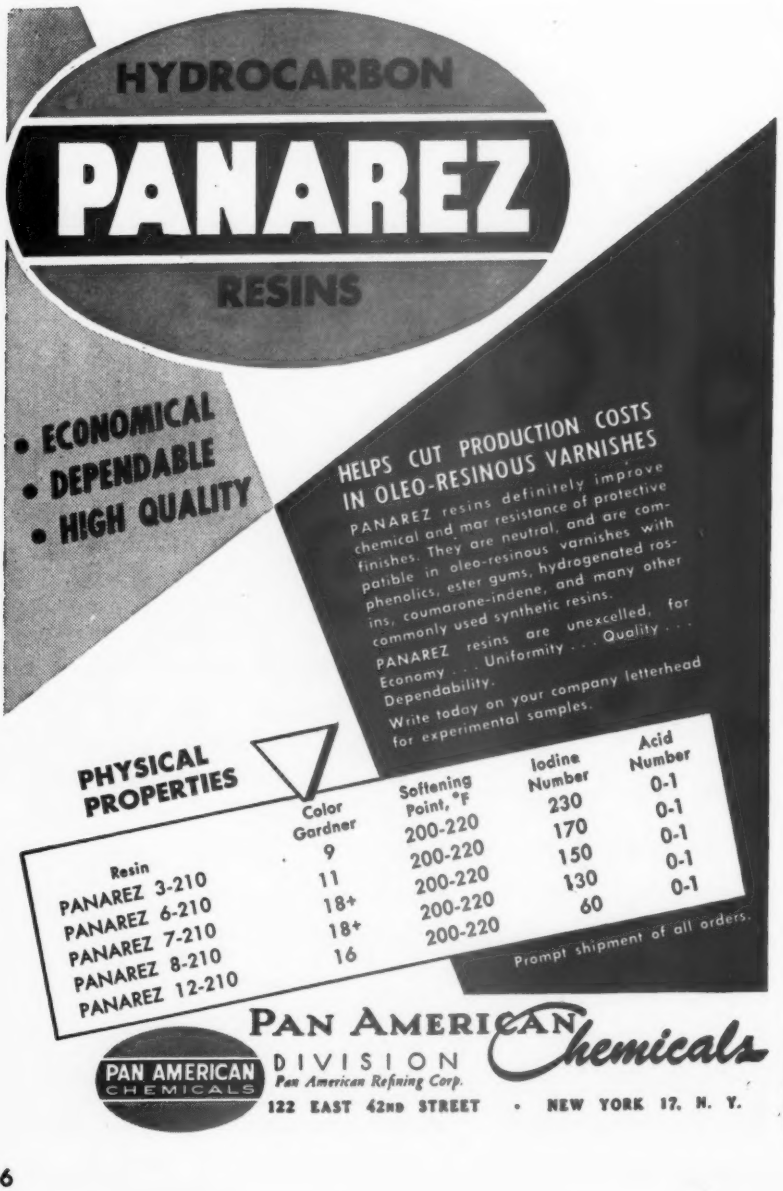
Dr. S. R. Benson has been appointed Director of Dry Color Research, and R. W. Davis has been named Superintendent of Dry Color Production. Both men have been employed in the Dry Color Department since 1936. Dr. Benson has served as research chemist and Group Research Leader. Mr. Davis held the position of Operator of the Dry Color Factory prior to his recent promotion.

CENTRAL SOLVENTS

John N. Adsit, formerly general manager of Indoken Pearlite Company, Cincinnati, Ohio, has joined Central Solvents & Chemicals Company of Chicago as a sales and technical representative. Mr. Adsit has also been associated with the Celanese Corporation of America. He is a member of the Paint, Varnish & Lacquer Association of Detroit.

EMERY

Dr. R. Ray Estes has been appointed to the research staff. He will be connected to the New Chemicals Department. Dr. Estes' most recent position was as assistant professor in chemistry and director of research at the University of Kentucky.


HYDROCARBON
PANAREZ
RESINS
• ECONOMICAL
• DEPENDABLE
• HIGH QUALITY
HELPS CUT PRODUCTION COSTS IN OLEO-RESINOUS VARNISHES
PANAREZ resins definitely improve chemical and mar resistance of protective finishes. They are neutral, and are compatible in oleo-resinous varnishes with phenolics, ester gums, hydrogenated rosins, coumarone-indene, and many other commonly used synthetic resins.
PANAREZ resins are unexcelled, for Economy . . . Uniformity . . . Quality . . . Dependability.
Write today on your company letterhead for experimental samples.
PHYSICAL PROPERTIES
Resin | Color Gardner | Softening Point, °F | Iodine Number | Acid Number
PANAREZ 3-210 | 9 | 200-220 | 230 | 0-1
PANAREZ 6-210 | 11 | 200-220 | 170 | 0-1
PANAREZ 7-210 | 18+ | 200-220 | 150 | 0-1
PANAREZ 8-210 | 18+ | 200-220 | 130 | 0-1
PANAREZ 12-210 | 16 | 200-220 | 60 | 0-1
Prompt shipment of all orders.
PAN AMERICAN Chemicals
PAN AMERICAN CHEMICALS
DIVISION
Pan American Refining Corp.
122 EAST 42ND STREET • NEW YORK 17, N. Y.

T. E. Alwyn

D. B. Craver

AMERICAN CAN

T. E. Alwyn, vice president, formerly in charge of sales, has been elevated to the firm's executive department where he will work directly with other principal executive officers in the overall administration of the company. Mr. Alwyn joined Canco in 1924 as a sales trainee at the Brooklyn, N. Y., plant. He became General Manager of Sales in 1950, and was elected Vice President in charge of sales in 1951.

D. B. Craver, General Manager of Sales, has been elected Vice President in Charge of sales. He began his career with the firm in Baltimore, Md., and was named general manager of sales in 1952.

SHELL CHEMICAL

Cecil W. Humphreys has been appointed Vice President in charge of Manufacturing. He had previously been general manager and manager of development for the firm's manufacturing department. Mr. Humphreys joined the Shell Chemical Corporation as a laboraory assistant at the Pittsburg, California, Plant. He has also served as assistant superintendent of the Dominguez plant, manager of the chemical plant in Houston, Texas, and in 1946, manager of operations nation wide in Shell's manufacturing department.

C. W. Humphreys

CELANESE

Raymond A. Gobeil has been named head of the physical testing laboratory; **Joseph A. Berg,** head of personnel administration; and **Harold K. Haviland** as associate head of the technical information section.

Frank W. Turner has been appointed sales service engineer of the Marco Products Department of the Plastics Division. He will assume his duties at the Marco Products plant, Linden, N. J. Mr. Turner was formerly with Celanese's Central Engineering Department.

ALKYDOL LABORATORIES

Harald S. Julsrud has joined the firm as Sales Manager. He began his career in the resin field as a chemist with the Archer-Daniels-Midland Company in 1935, first in production control and later research and sales service. In 1937, Mr. Julsrud joined Procter and Johnson, Chicago agents for ADM, where he had been employed prior to his new post. Mr. Julsrud organized the first of several North Dakota Alumni Paint Chemist Clubs now in existence, and is also a member of the American Oil Chemists Society.

H. S. Julsrud

SPENCER-KELLOGG

Charles E. Lacey, District Sales Manager since 1933, has resigned from the firm. **Albert J. Engel** is being appointed as Mr. Lacey's successor, and **Gordon F. Greer** is being transferred from Spencer-Kellogg's Buffalo, N. Y. office to take over Mr. Engel's former place as first assistant to the District Sales Manager.

UNION CARBIDE

Dr. Raymond W. McNamee has been named Manager of Research Administration. He will help co-ordinate the research activities of all of the Corporation laboratories where work is being done on alloys, chemicals, gases, carbons, and plastics. Dr. McNamee, this year's winner of the Herty Medal of the American Chemical Society for "outstanding contributions to chemistry in the Southeast," joined Union Carbide in 1933.

Dr. Franklin Johnston has been named to take over Dr. McNamee's former position of Superintendent of the Research and Development Department of Carbide and Carbon Chemicals Company. Dr. Johnston was formerly Assistant Director of Research for the Company.

Dr. Henry C. Chitwood, former research group leader, has been appointed Assistant Director of Research-Organic Chemicals. Dr. Chitwood joined Carbide and Carbon Chemicals in 1934.

GIVAUDAN-DELAWANNA

James L. Stevenson has joined the firm as a representative in the Detroit area. He was formerly associated with the Chrysler Export Corporation where he handled sales relations with the Caribbean area and Central and South America.

WILLIAMS

announces new line of

natural iron oxide pigments

very very fine

VVF

VVF pigments are produced by our unique grinding process to give a *very, very,* fine product controlled for top particle size and particle size distribution.

VVF pigments will reduce your grinding and dispersing time in paints and allied products as much as 75%.

VVF pigments give you brighter mass color, stronger tint, increased hiding power, and higher gloss than standard grind pigments.

VVF pigments now available are—Raw and Burnt Siennas, Raw and Burnt Umbers, Metallic Browns, Red Iron Oxide, and Primer Pigments.

Your Williams representatives will gladly give you complete information on this new pigment group—or mail coupon for illustrated VVF TECH REPORT.

WILLIAMS
COLORS & PIGMENTS
"OUR 75th YEAR"

C. K. Williams & Co.
Easton, Pa.
East St. Louis, Ill.
Emeryville, Cal.

MAIL COUPON TODAY

C. K. WILLIAMS & CO., Easton, Pa., Dept. 23

Please send me VVF TECH REPORT giving physical and chemical specifications and list of suggested applications.

Name_____ Title_____

Company_____

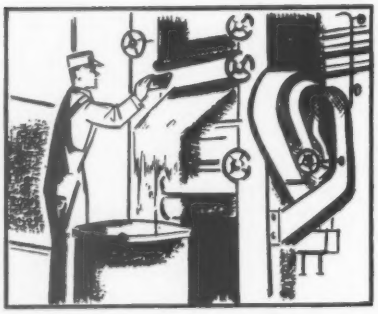
Address_____

ISCO CHEMICAL SALES AND SERVICE

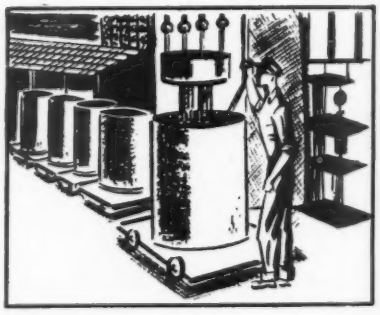
Since 1816

Where Innis, Speiden Service Helps You!

Silica, extender for paints. ISCO Amorphous Pure Soft Decomposed. Prime, white and uniform-99½% pure.



Talc, extender for paints. Sierra Fibrene C-400—all particles finer than 40 microns. Sierra Mistron-surface mean diameter of 0.76 microns.



Diatomaceous Earth, extender for paints and decolorizing agent for shellacs and varnishes.

There is no better source for heavy chemicals and white goods than Innis, Speiden! For 137 years this name has been a chemical industry by-word. From ISCO sales offices and stock points throughout the United States you can depend upon prompt shipment and service that follows through. ISCO products are high in quality and backed by expert assistance on application problems. Your inquiry for full information on ISCO products will receive immediate attention. INNIS, SPEIDEN & CO., INC., 420 LEXINGTON AVE., NEW YORK 17, N. Y. SALES OFFICES IN BOSTON, CHICAGO, CLEVELAND, AND PHILADELPHIA.

ISCO PRODUCTS
for the
PAINT INDUSTRY

Casein — Silicas — Talcs

Diatomaceous Earth

INNIS ISCO SPEIDEN

Since 1816

KOPPERS CO.

Dr. G. A. Webb has been named Assistant to the Manager of the Research Department. He formerly held the position of Executive Secretary of the New Products Committee. Dr. Webb joined the firm in 1941 under a Koppers Fellowship at Mellon Institute, where until 1943 he was in charge of certain catalytic developments. Most recently he was Assistant Manager Development Section.

J. Donald May has been named Manager of the Finance Section of the firm's Tar Products Division. He joined Koppers in 1927, and most previously was Manager of the Control Section.

Robert L. Woodard succeeds Mr. May as Manager of the Control Section. He joined Koppers as a staff assistant in the Control Section of the Tar Products Division in 1952. Most recently he was Administrative Assistant in the Division's Technical Department in 1952.

CONSOLIDATED CHEMICAL

C. M. Hickey, formerly General Superintendent of Plants in the firm's Southern Division, has been appointed Manager of Manufacturing. Mr. Hickey has been with the company since 1924, and will continue to have his headquarters in Houston, Tex.

CONTINENTAL CARBON

R. A. Reinke, superintendent of the Continental Oil Black Co., Westlake, La., since 1951, has been promoted to technical coordinator of Continental Carbon Company, Amarillo, Texas. He will direct the company's Amarillo control and technical service laboratory and function as company liaison officer between plant production and sales.

ASTM

Fred F. Van Atta has been named Special Assistant on the Headquarters Staff of the American Society for Testing Materials. For the immediate future, he will concentrate his work on coordinating and extending the ASTM developmental and promotional activities. Most recently, Mr. Van Atta was Manager of the Building Division of the Carolinas Branch, Associated General Contractors; and formerly Acting Secretary-Treasurer of the American Concrete Institute and editor of the ACI Journal.

KYANIZE PAINTS

William Binder, formerly director of Research paints, has rejoined the firm. For the present, Mr. Binder has been assigned to a special new product development project in cooperation with John Kaheny, technical director.

EMERY INDUSTRIES

Walter T. Meinert has been named Assistant Director of the Development and Service Department. He has been a member of the department for the past four years during which time he was active in both the development of new products and in technical service activities. Mr. Meinert is a member of the American Chemical Society, American Association of Textile Chemists and Colorists, and the American Oil Chemists Society.

W. T. Meinert

VELSICOL

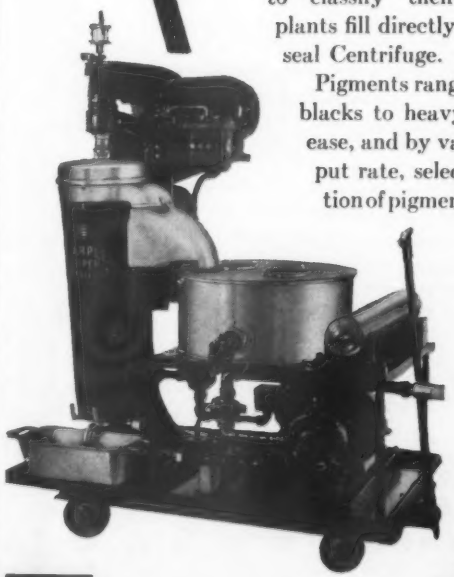
William M. Spaulding, formerly Assistant General Freight Agent, Chicago Rock Island & Pacific Railroad, has been appointed Traffic Manager of the Velsicol Corporation, Chicago. Subsequent to his association with Rock Island, Mr. Spaulding served as Traffic Manager with the Pettibone Company and Continental Can Company, both of Chicago. Mr. Spaulding has been active in many important cases and hearings before the ICC.

W. M. Spaulding

WHAT PRICE AGGLOMERATES and OVERSIZED PARTICLES?

Fine lacquers, enamels, printing inks, dye pastes and similar pigmented goods demand close attention to uniform particle size—and to safeguard product quality economically, many modern plants are utilizing the flexibility of the Sharples Vaporseal Centrifuge to "classify" their pigments. In fact many plants fill directly from the Sharples Vaporseal Centrifuge.

Pigments ranging in size from light carbon blacks to heavy chromes are handled with ease, and by varying the speed and throughput rate, selective clarification or classification of pigmented goods is a routine procedure.



Why not investigate the savings made possible by the use of the highest centrifugal force available, to remove over-sized pigments and foreign matter. It costs you nothing to get the facts. Get in touch with Sharples.

SHARPLES

THE SHARPLES CORPORATION
2300 WESTMORELAND STREET, PHILADELPHIA 40, PENNA.

NAUGATUCK CHEMICAL

Lawrence H. Bruce, technical representative for the latex and aqueous group in the New York and New Jersey area, has been assigned to Akron, O., in a similar capacity. His territory includes Ohio, Western Pennsylvania, part of Indiana, West Virginia and the eastern part of Kentucky. Mr. Bruce has been with Naugatuck Chemical for 11 years.

AMERICAN CYANAMID

A. J. Perantoni has been named supervisor of Pigments and Explosive advertising. He was previously connected with the Pigment Technical Service Laboratory at Calco before assuming his new position with the Advertising Department.

AMERICAN CAN

J. W. Wardell, formerly commodity manager of the Central Division sales department in Chicago, has been named sales manager of the firm's Metropolitan New York district.

T. K. Webster, formerly sales manager of the Chicago district, has been appointed to succeed Mr. Wardell as non-foods commodity manager for the Central division.

J. S. Austin, assistant manager of the Chicago district sales office since, succeeds Mr. Webster.

O'BRIEN CORPORATION

Michael F. Twomey, Jr., has been named Sales Promotion Manager, a newly created post. He will be responsible for the coordination of O'Brien's sales training, publicity, and promotional activities.

WAGENMAN PAINT

Walter J. Carr has been promoted to Vice President. He was previously assistant to the President. In his new position, Mr. Carr will continue to supervise the firm's advertising and merchandising program. Before joining Wagenman Paint, he had been associated with Meldrum and Fewsmith, Inc., a Cleveland advertising agency, for five and a half years, and the Sherwin-Williams Company for five years.

W. J. Carr

Chats about Finishes

ETHYL CELLULOSE LACQUERS—SOLUTION FOR MANY PROBLEMS

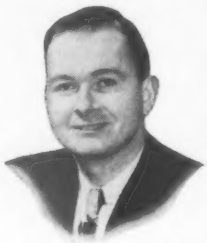
by

CLARENCE W. GAULT

Manager of

Ethyl Cellulose Sales

Hercules' Cellulose Products Dept.



If you have a particularly tough lacquer problem, the unique properties of ethyl cellulose may hold the key to its solution. Ethyl cellulose is used on widely different surfaces including plastics such as polystyrene, and on rubber, metal, wood, and paper. It also forms the base of many liquid adhesives, strippable protective coatings, and gel lacquers.

Our extensive research on ethyl cellulose coatings has given us valuable data that may help you find the answer to your problem. We also have available a new technical booklet about ethyl cellulose specialty lacquers. Write me and I'll be glad to send you the booklet or give you information about specific problems that have been solved using ethyl cellulose.

Clarence W. Gault

Cellulose Products Department

HERCULES POWDER COMPANY

INCORPORATED

926 Market Street, Wilmington 99, Del.

IC53-7

CELANESE CORP.

Robert L. Johnson has been named to the Field Technical Service Staff of the Marco Products Department, Plastics Division. Formerly with the E. L. Cournand Company, Mr. Johnson will be located at the Merchandise Mart, Chicago.

Richard N. Campen has joined the Field Technical Service Staff of the Marco Products Department, Plastics Division. Mr. Campen will make his headquarters in the Cleveland District Sales Office in Cleveland, O.

AMERICAN-MARIETTA

John S. Horn has joined the sales staff in the firm's synthetic resins division. He will make his headquarters in the Chicago office and his activities will be mainly among industrial users of synthetic resins in the hardboard, fibreglass and related industries. Mr. Horn was formerly associated with Acme Resins of Forest Park, Ill., as sales manager. He has been active in research and development as well as sales of synthetic resins since 1942.

J. S. Horn

UNIVERSAL DETERGENTS

Jameson Chemical Co., Chicago, has been named sales agent for Illinois, Indiana, southwestern Michigan and eastern Iowa.

M. H. Baker, Minneapolis, Minn., will cover western Iowa, Minnesota, Omaha, Nebraska, and La Cross, Superior, and Eau Claire, Wis.

J. W. Copps, Milwaukee, Wis., will handle the Milwaukee area.

For High Quality, Low Cost Metal Coating Finishes

Velsicol Resins AD-4 and AD-21 are especially suitable for use in air dry or baking oleoresinous metal coating vehicles. They impart excellent quality and economy to protective and decorative metal coating finishes. Among the many applications are coatings for drums, pails, cans, auto chassis, auto parts, coil springs, and trays. These resins are neutral and non-saponifiable. They are chemically resistant to water, aqueous acids, alkalis, and many other materials, these resistance properties being imparted to coatings. They possess excellent film forming properties, and can be formulated to provide hard, flexible resistant, and adherent films. For further information, write to the Velsicol Corporation Technical Department.

OTHER SUGGESTED APPLICATIONS FOR VELSICOL RESINS

- Floor and trim vehicles.
- General utility varnishes.
- Traffic paints.
- Extenders for 100% oil soluble phenolic resins.
- Extenders for Chlorinated rubber.
- Grinding liquids.
- Aluminum paints.

PROPERTIES

- Low degree of solvent retentivity.
- Non-acidic.
- Non-saponifiable.
- Coatings resistant to water, aqueous acids and alkalis.
- Soluble in aliphatic and aromatic naphthas.
- Compatible with vegetable and marine drying oils.
- Vehicle films are hard, flexible and adherent.
- Resin solutions promote excellent leafing and flooding of aluminum pigment.

PETROLEUM DERIVED CHEMICALS
VELSICOL
SERVING BASIC INDUSTRIES

VELSICOL CORPORATION

General Offices and Laboratories
330 East Grand Avenue, Chicago 11, Illinois

Export Division
100 East 42nd Street, New York 17, New York

REPRESENTATIVES IN PRINCIPAL CITIES

Chemical Firm Representatives Tour Hercules Powder Plant

More than 30 representatives from leading American chemical firms were guests recently of the Hercules Powder Company's Mansfield, Mass., plant to see in action a mechanized quality control system used there.

The all-day tour began with talks by Hercules executives who said the strain-cell weighing equipment and automatic controls made possible the high quality and uniformity of the pentaerythritol manufactured at the plant.

All instruments used in the control system were manufactured by the Foxboro Company, of Foxboro, Mass., and the Baldwin Lima Hamilton Company of Eddystone, Pa. Engineers from both companies were present to provide technical information.

The visitors were invited by Hercules to inspect the apparatus with a view to adapting it to other chemical operations in their respective companies.

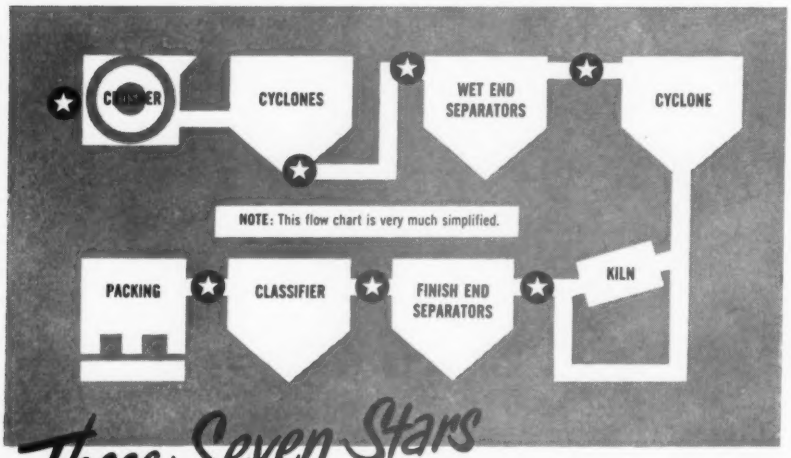
•

National Can Corp. To Expand Production in its Ohio Plant

The National Can Corporation is expanding production facilities at its Hamilton, Ohio, plant.

First phase of the expansion program will be the purchase of completely automatic double-die press units for the production of can ends.

Other steps in this program will be the installation of new can manufacturing lines and the acquisition of additional press equipment.



These Seven Stars are Seven EYES

GUARDING DICALITE QUALITY

...in the most conscientious quality-control system yet devised—beginning with crude selection and ending only when products pass the final test-run on a thief sample *after* bagging.

Actually, these stars represent only major "check points" in what is esentially a continuous quality control system, "built in" to the most modern processing plant ever engineered for the diatomaceous silica industry*. So exact are the controls on every step that processing can be held within narrower limits than were ever practicable before.

To you, this means even higher quality Dicalite – assurance that every sack of every Dicalite product will be uniform in particle size, particle range and distribution, and in other physical and chemical properties. Whether your processing involves filtration, filler materials, extenders, diluents, carriers, or absorbents, DICALITE's unvarying top quality gives you better processing, better products.

*If you'd like to see the more detailed flow sheet of DICALITE's new Lompoc plant, and learn more about how top quality in diatomite products is achieved, write today for your free reprint of the feature article in the February issue of Industrial & Engineering Chemistry. Write Great Lakes Carbon Corporation, Dept. D-5 614 So. Flower St., Los Angeles 17.

Dependable GREAT LAKES Dicalite® DIATOMACEOUS MATERIALS

DICALITE DIVISION • GREAT LAKES CARBON CORPORATION • NEW YORK 17 • CHICAGO 1 • LOS ANGELES 17

CALENDAR OF EVENTS

Nov. 16-18. 6th Annual Convention and Exhibit of Retail Paint and Wallpaper Distributors of America, Inc., Hotel Statler, New York, N. Y.

Nov. 19-21. 16th Annual Convention of National Paint Salesmen's Assoc., Hotel New Yorker, New York, N. Y.

Nov. 30-Dec. 5. 24th Biennial Chemical Industries Show, Commercial Museum and Convention Hall, Philadelphia, Pa.

Dec. 6-8. 40th Annual Meeting of the Chemical Specialties Manufacturers Assoc., Hotel Mayflower, Washington, D. C.

Jan. 25-28. Plant Maintenance and Engineering Show, International Amphitheatre, Chicago, Ill.

Production Club Meetings

Baltimore, 2nd Friday, Park Plaza Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Hotel Alms.
Dayton — Nov., Feb., April, Suttmillers.
Indianapolis — Sept., Claypoll Hotel.
Columbus — Jan., June, Fort Hayes Hotel.

Cleveland, 3rd Friday, Harvey Restaurant.

Dallas, 2nd Thursday, No Fixed Place.

Detroit, 4th Tuesday, Rackham Buildng.

Golden Gate, Last Monday, El Jardin Restaurant, San Francisco.

Houston, 2nd Tuesday, Seven Seas Restaurant.

Kansas City, 2nd Wednesday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, Puritan Hotel, Boston.

New York, 1st Thursday, Brass Rail, 100 Park Ave.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, Annual Meetings only.

Philadelphia, 3rd Wednesday, Engineer's Club.

Pittsburgh, 1st Monday, Fort Pitt Hotel.

St. Louis, 3rd Tuesday, Forest Park Hotel.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Diana Sweets, Ltd.

Western New York, 1st Monday, 40-8 Club, Buffalo.

Harshaw Driers help maintain your reputation for quality!

In fact, Harshaw Driers protect *two* reputations for quality—yours *and* ours. To make sure they do, strict Harshaw manufacturing specifications demand the following tests on every batch of driers produced at our plant:

Metal content
Specific gravity
Color
Viscosity
Total solids content
Flash point (T.C.C.)
Moisture content
Acid value
Miscibility with raw linseed oil
Miscibility with mineral spirits
Benzene insoluble content
Customer's specified tests

Material released for shipment complies with the strict tolerances necessary for top quality.

Remembering these exhaustive tests, you can order your next batch of Harshaw Driers with the full assurance that they *will* help to maintain your reputation for quality.

LIQUID DRIERS
- **Uversol (Naphthenate) Liquids**
- **Linoresinate Liquids**
- **Lo-Odor Liquids**
- **Linoleate Liquids**
- **Lithos**
- **Octasols**
- **Pastes**
- **Pastalls**

SOLID DRIERS
- **Uversol (Naphthenate) Solids**
- **Linoresinate Solids**
- **Linoleate Solids**
- **Soyate Solids**
- **Fused Resinates**

POWDERED DRIERS
- **Precipitated Resinates**
- **Drying Salts:**
  - **Cobalt**
  - **Lead**
  - **Manganese**
  - **Zinc**

HARSHAW

THE HARSHAW CHEMICAL CO.
1945 East 97th Street, Cleveland 6, Ohio
BRANCHES IN PRINCIPAL CITIES

General Mills' Chemical Products Dept. Moves to Kankakee, Illinois

The Chemical Products Sales Department of General Mills' Chemical Division will move from Minneapolis, Minn., to Kankakee, Ill.

W. B. Brown is manager of the Kankakee operations and Abner C. Hopkins, Jr., is director of Chemical Sales. Mr. Hopkins will be assisted by M. S. Herban, S. J. Murphy and W. S. Mitchell, who have been named manager of technical sales and services for Eastern, Central and Western Districts, respectively.

Purchase of all raw materials will be handled at the new office, under the direction of L. C. Young. This is designed to consolidate total plant activity and improve service to customers, according to Sewall D. Andrew, Jr., General Manager of the Division.

Givaudan-Delawanna Vice Pres. Returns from European Trip

Dr. Max Luthy, Vice President in Charge of Production and Research of Givaudan-Delawanna, Inc., New York, N. Y., recently returned from a three-month visit to Europe.

While abroad, Dr. Luthy visited L. Givaudan & Cie., S. A., Vernier-Geneva, Switzerland, as well as other associate companies in Italy, France and England.

Baker Caster Oil Co. Opens New Sales Office in Berkeley, Calif.

The Baker Castor Oil Company has opened a new sales office at 640 Gilman St., Berkeley, Calif.

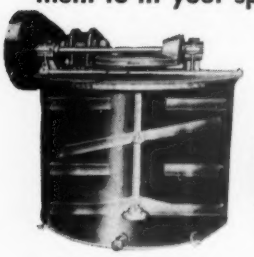
Marvin C. Rasmussen has been placed in charge of the office, servicing all accounts in the Bay Area.

Prior to joining Baker, Mr. Rasmussen was employed as a Technical Service Engineer in the Research and Development Division of S. C. Johnson & Son, Inc.

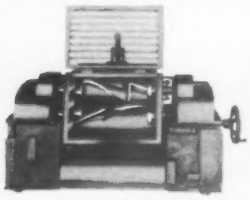
He is a member of the Golden Gate Production Club.

DURABILITY AND DEPENDABLE SERVICE

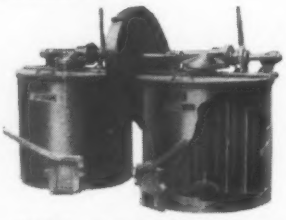
Over 80 years of Ross experience in the manufacture of Mills and Mixers of all types assures the proper selection of equipment to fit your specific processing requirements.



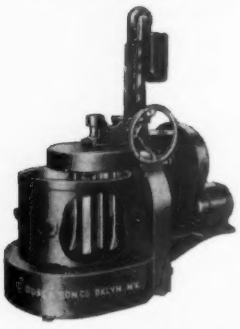
#36 – Liquid Mixer



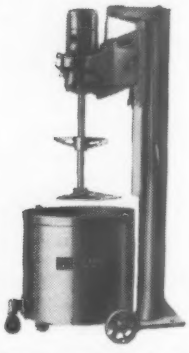
#41L – Heavy Duty Kneader



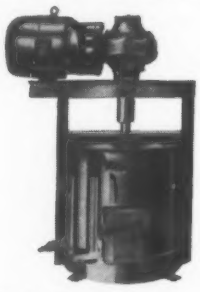
#36RM – Twin Semi-Paste Mixer



#30C – Change Can Mixer



#131AB – Change Tank Mixer



#132 – Heavy Paste Mixer

1-Gallon Variable Speed Laboratory Mixer

Mixers available in laboratory, pilot scale, and large production sizes.

Write for further details!

2,000 Gallon Agitated Storage Tank

CHARLES ROSS & SON COMPANY

148 Classon Avenue Brooklyn 5, New York

QUALITY CONTROL

(*From page 28*)

can be stated with what specification limits the product complies. If the process is in a state of statistical control, greater uniformity of the product cannot be achieved without changing the process itself. Hence, it is known that the process is being operated as efficiently as possible as far as the particular quality characteristic is concerned.

(5) The control chart is indispensable if an attempt is being made to bring a process from an uncontrolled to a controlled state. It is also invaluable for assessing in quantitative terms the effect of modifications in operating methods or of changes in equipment. Unaided judgment cannot always decide whether a significant improvement has been made or not, and opinion frequently differs on whether a change in process or equipment has made any improvement or not. Control charts enable such differences of opinion to be resolved.

(6) For any degree of certainty about predictions relating to the quality characteristics of a product the recording and analysis of test results by methods based on statistical principles, i.e., control charts, are the most economical. With the process in a state of statistical control, testing may be reduced to a minimum.

Quality control in the paint industry can be applied to the raw materials, work-in-process, and finished goods. These will be discussed later in the series.

References

1. Bidlack, V. C., and Fasig, E. W., "Paint and Varnish Production Manual" (John Wiley & Sons, Inc., New York, 1951), pp. 236-241
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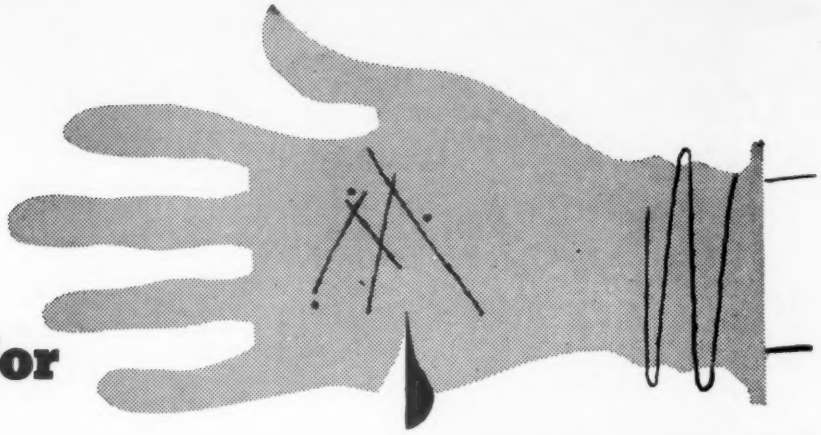
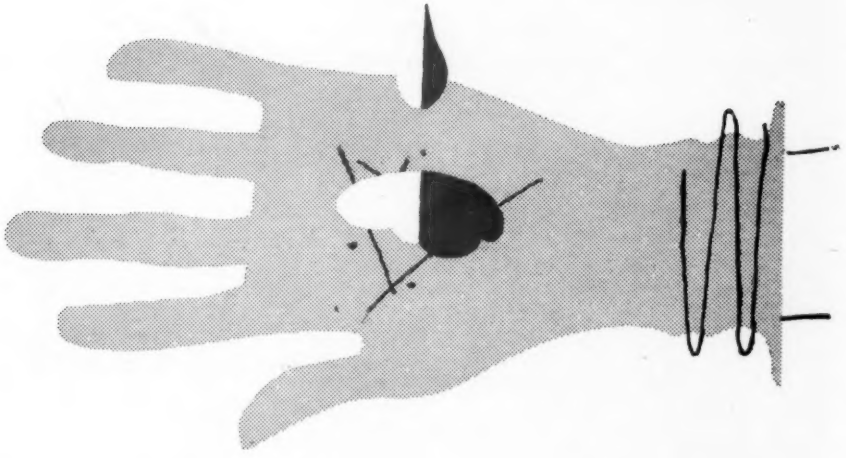
3. Interview, June 6, 1952, with Mr. Ben Einhorn, President of the Adelphi Paint & Color Works Inc.
4. Arkin, H., and Colton, R. R., "An Outline of Statistical Methods" (Barnes and Noble, Inc., New York, 1950)m p. 1.
5. Stearns, E. I., reprinted from Chemical & Metallurgical Engineering, May 1946.
6. Westman, A. E. R., "Statistical and Quality Control Methods in Industrial Chemistry and Process Industries, August 1947, Vol. XXXI, No. 8, pp. 716-725.
7. Westman, *op. cit.*, pp. 716-725.
8. Bicking, Charles A., "Statistical Techniques for Production Control and Plant Scale Experimentation", Industrial Quality Control, May 1947, Vol. 3, No. VI, p. 11.



Kid Gloves for

A. Gross Coconut Fatty Acids



A. GROSS & COMPANY'S advanced techniques in the processing, packaging and shipping of COCONUT FATTY ACIDS are your assurance of unmatched color, stability and performance.

A. GROSS uses the most modern aluminum and stainless steel processing equipment, packages carefully, and ships in lined drums, aluminum tankwagons and tankcars.

When you receive our COCONUT FATTY ACIDS for your manufacture, we know that this "kid glove handling" will insure you of resins, cosmetics, detergents and shampoos of highest quality.

Send for samples and our booklet *"Fatty Acids in Modern Industry"*.

A. Gross & Company

295 Madison Avenue, New York 17, N. Y.

Manufacturers since 1837 ● *Factory; Newark, N. J.* ● *Distributors in principal cities*

the chemist's page

Odorex driers specially developed for odorless paints

Odorex Driers and their advantages:

Odorex Driers are equal in drying performance to standard Nuodex driers. They have been developed specifically for odorless paint systems and are made from specially selected and treated fatty acids and odorless-type solvents in the four most important metals: lead 24%, cobalt 6%, manganese 6%, and calcium 4%.

The metal content of each Odorex Drier is guaranteed within ±0.1% by exclusive Nuodex certification. Odorex Driers are: (1) easy to handle because of low viscosity . . . (2) completely soluble, stable and intermixable as concentrations or solutions—alone, in vehicles or in pigmented compositions... (3) processed for minimum staining properties.

For more data on Odorex Driers:

Consult your Nuodex agent for technical data, samples and prices on Odorex Driers or write today to Nuodex Products Co., Inc., Elizabeth, N. J.

You Can Rely on **NUODEX** for

Delivery . . . overnight from 28 warehouses and 4 separate plants

Service . . . through 34 sales agencies, 4 technical regional offices, and 3 laboratories serving all paint centers

Research . . to maintain, improve and develop quality products

Plants at
Elizabeth and Newark, N. J.,
Long Beach, Calif.,
Leaside (Toronto), Ontario, Canada

© 1953 Nuodex Products Co., Inc.

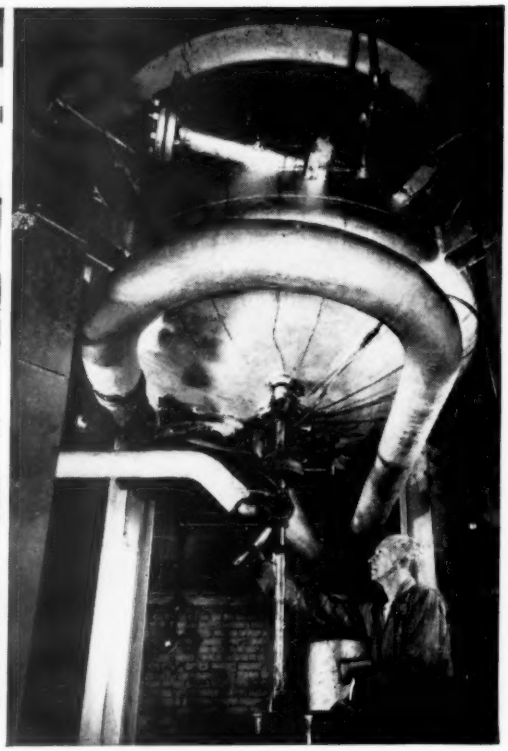
DRIERS • FUNGICIDES MIXING & MILLING AIDS

CONSULT YOUR NEAREST NUODEX REPRESENTATIVE

ALLSTON, D. H. Litter Co., Inc.; ATLANTA, R. T. Hopkins; BUFFALO, Commercial Chemicals, Inc.; CHICAGO, J. W. VanTuin Co.; CINCINNATI, B. H. Roettker Company; CLEVELAND, A. C. Mueller Co.; DALLAS, Thompson-Hayward Chemical Co. of Texas; DAVENPORT, Thompson-Hayward Chemical Co.; DENVER, Thompson-Hayward Chemical Co.; DES MOINES, Thompson-Hayward Chemical Co.; DETROIT, Baker & Collinson; HOUSTON, Thompson-Hayward Chemical Co.; INDIANAPOLIS, Indiana Naval Stores Co.; KANSAS CITY, Abner Hood Chemical Company; LOS ANGELES, Nuodex Products Co., Inc.; LOUISVILLE, B. H. Boyet & Company; MEMPHIS, Thompson-Hayward Chemical Co.; MILWAUKEE, R. L. Ferguson; MINNEAPOLIS, Thompson-Hayward Chemical Co.; NASHVILLE, Post Brokerage Company; NEW ORLEANS, Thompson-Hayward Chemical Co.; NEW YORK, D. H. Litter Co., Inc.; OKLAHOMA CITY, Thompson-Hayward Chemical Co.; OMAHA, Thompson-Hayward Chemical Co.; PHILADELPHIA, Harry W. Gaffney; PITTSBURGH, John D. Butts; PORTLAND, Fred E. Alsop & Co.; RICHMOND, F. V. Gunn & Co., Inc.; ST. LOUIS, J. E. Niehaus & Co.; SAN ANTONIO, Thompson-Hayward Chemical Co.; SAN FRANCISCO, Cole & DeGraf; SEATTLE, D. B. Smith; TULSA, Thompson-Hayward Chemical Co.; WICHITA, Thompson-Hayward Chemical Co.

NEW DOW MONOMER OF INTEREST TO PRESENT USERS OF STYRENE

DOW vinyltoluene readily modifies all common paint-drying oils to produce new properties of interest to paint manufacturers



Vinyltoluene, the latest in a series of monomers developed in Dow's research laboratories, will supplement styrene in many beneficial ways. This new monomer shares properties in common with styrene, pointing to its advantageous substitution for styrene in creating new families of products such as synthetic rubber, rubber reinforcing resins, polyester resins, molding powders and paint vehicles.

Development work has demonstrated that paint vehicles made from vinyltoluene will be particularly valuable. While styrene will react with several usable paint vehicles, vinyltoluene has proved its ability to react to form clear, useful vehicles with *all* of the commercially important, low-cost drying oils.

Quantities of vinyltoluene sufficient for developmental work are now available. For copies of the vinyltoluene-styrene comparison chart write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Dept. PL 1357E

you can depend on DOW CHEMICALS DOW

PATENTS

Conducted by

Lancaster, Allwine & Rommel

PATENTS AND COPYRIGHTS

424 Bowen Building,
Washington, D. C.

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired to Lancaster, Allwine & Rommel.

Hydrocarbon Drying Oils

U. S. Patent 2,645,649. Alfred E. Hoffman, Clarendon Hills, Ill., assignor to Universal Oil Products Company, Chicago, Ill., a corporation of Delaware.

A process for improving the air-drying properties of a liquid co-polymer resulting from the co-polymerization of an aliphatic mono-isoolefin hydrocarbon and a conjugated diolefin hydrocarbon, each containing not more than about 8 carbon atoms per molecule, in the presence of hydrogen fluoride catalyst at a temperature of from about—100° to about 0° C., whereby the copolymer contains organic fluorides, said process comprising separating said liquid co-polymer from the hydorgen fluoride catalyst and thereafter commingling therewith a polyhydric alcohol in the ratio of from about 1 to 1 to about 100 to 1 weight proportions of co-polymer to polyhydric alcohol, and subjecting the resultant mixture to reaction at a temperature of from about 50° to about 250° C. to effect substantial condensation of the hydroxyl groups of said alcohol with the organic fluorides in the co-polymer.

The process of claim 1 further characterized in that said co-polymer and polyhydric alcohol are reacted with a carboxylic acid.

Thixotropic Coating

U. S. Patent 2,645,626. Birger W. Nordlander and Robert E. Burnett, Schenectady, N. Y., assignors to General Electric Company, a New York corporation.

A thixotropic coating composition comprising a polymerizable liquid comprising a liquid unsaturated alkyd resin obtained by the esterification of a mixture of ingredients comprising a polyhydric alcohol and an ethylenically unsaturated polycarboxylic acid and a polymerizable glycol ester of methacrylic acid and a filler selected from the class consisting of Fe_2O_3, Cr_2O_3, ZnO, TiO_2, Ni_2O_3 and SiO_2, the aforesaid filler comprising, by weight, from 45 to 70 percent of the total weight of the thixotropic composition.

Polyacrylic Nitrile Process

U. S. Patent 2,642,418. Heinrich Wenning, Marl in Westphalia, Germany, assignor to Chemische Werke Gesellschaft mit beschrankter Haftung, Kreis Recklinghausen, Germany, a corporation of Germany.

Process for the production of polyacrylic nitrile by polymerization of acrylic nitrile in aqueous dispersion in the presence of water soluble redox catalysts, characterized in that the dispersion is maintained under superatmospheric pressure and at a pH value of about 4 to 5 solely by the presence of dissolved carbon dioxide.

Melamine Resin

U. S. Patent 2,649,446. Raymond A. Vingee, Stamford, Conn., assignor to Allied Chemical & Dye Corporation, New York, N. Y., a corporation of New York.

A process of producing melamine which comprises heating in a pressure resistant vessel urea and ammonium sulfate in amounts up to and including about 10 mol percent of ammonium sulfate based on the urea taken and maintaining the thus heated materials at temperatures between about 300° C. and about 400° C. and under high pressure until substantial quantities of melamine are present in the reaction mixture, and recovering from said reaction mixture melamine thus produced.

Copolymers of Vinyl Phenols With Drying Oils

U. S. Patent 2,647,876. Edward Michael Evans, Tonbridge, and Stanley Erwin Bradshaw, Tunbridge Wells, England, and John Edward Seager Whitney, Penarth, Wales, assignors to British Resin Products Limited, London, England, a British company.

A process for the production of a synthetic varnish resin which consists of copolymerising a vinyl compound selected from the group consisting of ortho, meta and para-vinyl phenol, their methyl, ethyl and propyl nuclear substituted homologues having at least one reactive hydrogen atom attached directly to the nucleus and a mixture of styrene with such phenol, with a drying oil selected from the group consisting of tungoil, dehydrated castor oil, oiticica oil and linseed oil in the absence of oxygen, and interrupting the copolymerisation prior to gelation and adding a volatile aromatic hydrocarbon solvent for the resin.

Protective Coating

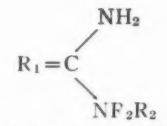
U. S. Patent 2,649,424. Benson G. Brand, Columbus, Ohio, assignor, by mesne assignments, to The Battelle Development Corporation, Columbus, Ohio, a corporation of Delaware.

The method of making a protective coating material which comprises heating from 65% to 40% of a China-wood oil and from 35% to 60% of polyterpene resin to a temperature between 230° C. and 245° C. to form a varnish; thinning said varnish with a suitable solvent; and thereafter mixing from 35% to 85% of said thinned varnish, based on the non-volatile weight, with a material comprising from 20% to 90% mica and the balance titanium dioxide.

Water-Soluble Urea-Aldehyde Products

U. S. Patent 2,650,910. Franz Kohler, Alsbach (Bergstrasse), Germany, assignor to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt am main, Germany, a corporation of Germany.

A process for the production of a water soluble urea-aldehyde resinous product which comprises heating at least one compound of the general formula



in which R_1 is selected from the group consisting of oxygen, sulfur and nitrogen, and R_2 and R_3 are selected from the group consisting of hydrogen, alkyl, alkenyl, aryl, acyl radicals of saturated acids and acyl radicals of unsaturated acids in the presence of water and an ammonia compound selected from the group consisting of ammonia and alkyl, oxalkyl and hydroxyl substituted ammonia in a proportion of 1 mole of the component of the above general formula to 0.01 to 0.5 mole of the ammonia compound, thereafter adding at least one aldehyde to the reaction product and condensing the reaction product with such aldehyde, only at a pH below 7.

Polyvinyl Methyl Ether

U. S. Patent 2,653,923. Joseph F. Shekleton, Easton, Pa., assignor to General Aniline & Film Corporation, New York, N. Y., a corporation of Delaware.

A process for producing a somewhat rubbery form-stable, non-sticky, curdlike polyvinyl methyl ether which comprises polymerizing vinyl methyl ether at a temperature from about—50° C. to about—70° C. in the presence of about 1%, based on the weight of the vinyl methyl ether, of a catalyst therefor and up to 9 parts by volume of diluent per part of said catalyst.

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Specifications

	Aropol 865	Aropol 880
Non-Volatile	49-51%	59-61%
Solvent	Petroleum Spirits	Xylol
Viscosity (C.H.)	Z-3—Z-5	Z—Z-3
Acid No. of Non-Volatile	3—8	3—8
Color (Gardner Std. '33)	8 max.	8 max.
Wt. per gallon @ 25°C.	7.75—7.85 lbs.	8.25—8.35 lbs.
Resin Modification	None	None
Oil Length	Short—Medium	Short

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Or take Primers. "Dutch Boy" Basic Silicate White Lead "45X" provides the lead soaps that increase adhesion. On top of this, it gives the film the water resistance needed to maintain a primer's adhesive bond and help prevent peeling.

Then take tinted House Paints. "45X" increases film durability and resistance to color change. It also promotes dirt removal because of its hydrophilic properties, and thus helps keep colors clean and fresh.

Finally, take Porch and Floor Enamels. "45X" plasticizes the film and increases its abrasion resistance. What's more, it forms lead soaps that contribute to the flexibility and water resistance of the film, and thus improve adhesion.

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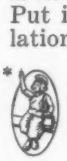

National Lead Company: New York 6; Atlanta; Buffalo 3; Chicago 8; Cincinnati 3; Cleveland 13; Dallas 2; Philadelphia 25; Pittsburgh 12; St. Louis 1; San Francisco 10; Boston 6 (National Lead Co. of Mass.).

Gel Lacquer

U. S. Patent 2,652,346. Ralph E. Porzer, Bloomfield, N. J., and Alan P. Baruch, Stamford, Conn., assignors to Celanese Corporation of America, a corporation of Delaware.

Process which comprises applying a cellulose nitrate undercoating to the surface of an article, coating said article with a gel lacquer comprising from about 15 to 40 parts by weight of cellulose propionate in about 100 parts by weight of a solvent mixture in which the solvents consist of from about 50 to 10% by weight of a material of the group consisting of propyl acetate, isopropyl acetate, butyl acetate and amyl acetate and from about 50 to 90% by weight of a material of the group consisting of xylol and toluol, and gelling the coating so produced by reducing its temperature below the gelation temperature.

Drying Oil Compositions

U. S. Patent 2,653,956. Edwin G. Marhofer, Fredonia, Kans., and John C. Hillyer, Bartlesville, Okla., assignors to Phillips Petroleum Company, a corporation of Delaware.

A process for producing a drying oil composition, which comprises admixing a polymer consisting essentially of an unsaturated, pre-dominantly open-chain liquid hydrocarbon polymer of an open chain conjugated diolefin, said polymer having a viscosity of from 20 to 150 poises at 77° F., with an unsaturated glyceride oil in the amount of 2 to 20 per cent by weight of said glyceride oil, and heating a resulting admixture at 550 to 600° F. for 2 to 6 hours.

Polyester Resins

U. S. Patent 2,652,383. John F. Davis, Stamford, Conn., assignor to American Cyanamid Company, New York, N. Y., a corporation of Maine.

A surface coating composition capable of producing, on curing, a crater-free film comprising a compatible blend of (1) a polyester resin composition comprising a polymerizable mixture of (a) a polymerizably reactive unsaturated alkyd resin, (b) a compatible polymerizably reactive material having at least one $CH_2=C<$ group and (*c*) a catalyst for accelerating the copolymerization of (*a*) and (*b*) and (2) 0.01%-5% by weight of a phenol-formaldehyde resin, based on the total weight of said polyester resin, wherein the phenol is selected from the group consisting of p-tertiary butyl phenol, p-secondary butyl phenol and o-tertiary amyl phenol and wherein said alkyd resin contains a plurality of polymerizably reactive alpha, beta enal groups.

Setting Protein Coatings With Ammonium

U. S. Patent 2,652,345. Jean E. Jones, Rochester, N. Y., assignor to Eastman Kodak Company, Rochester, N. Y., a corporation of New Jersey.

In the application of coatings of solutions in water of at least 2% concentration of protein having a pH at which the protein will remain in solution at room temperature which protein solutions contain therein in suspension silver halide particles, to a support therefor, the method of quick setting those coatings which comprises incorporating in the protein solution containing the silver halide in suspension therein ¼-50% (based on the weight of the protein) of an aldehyde selected from the group consisting of formaldehyde, glyoxal and acrolein, coating out the protein composition in fluid form onto the support and fuming the coating with gaseous ammonia whereby rapid setting of the coating is obtained without chilling thereof being necessary.

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REACTION OF STYRENE

(*From page 33*)

culated for $C_{13}H_{10}O_2$: C: 78.77%; H: 5.05%.

The acid was further identified as a carboxylic acid of diphenyl by a micro-distillation of its calcium salt with lime, obtaining a very small quantity of solid m.p. 64-67°C (diphenyl: m.p. 70°), insufficient for purification.

Acknowledgment

The author wishes to express his thanks to the Management of Lewis Berger (Great Britain) Ltd. for sponsoring this work (originally published as a thesis (University of London) under the supervision of Professor H. Burton) and to their Research Manager, Mr. F. Armitage, for encouragement.

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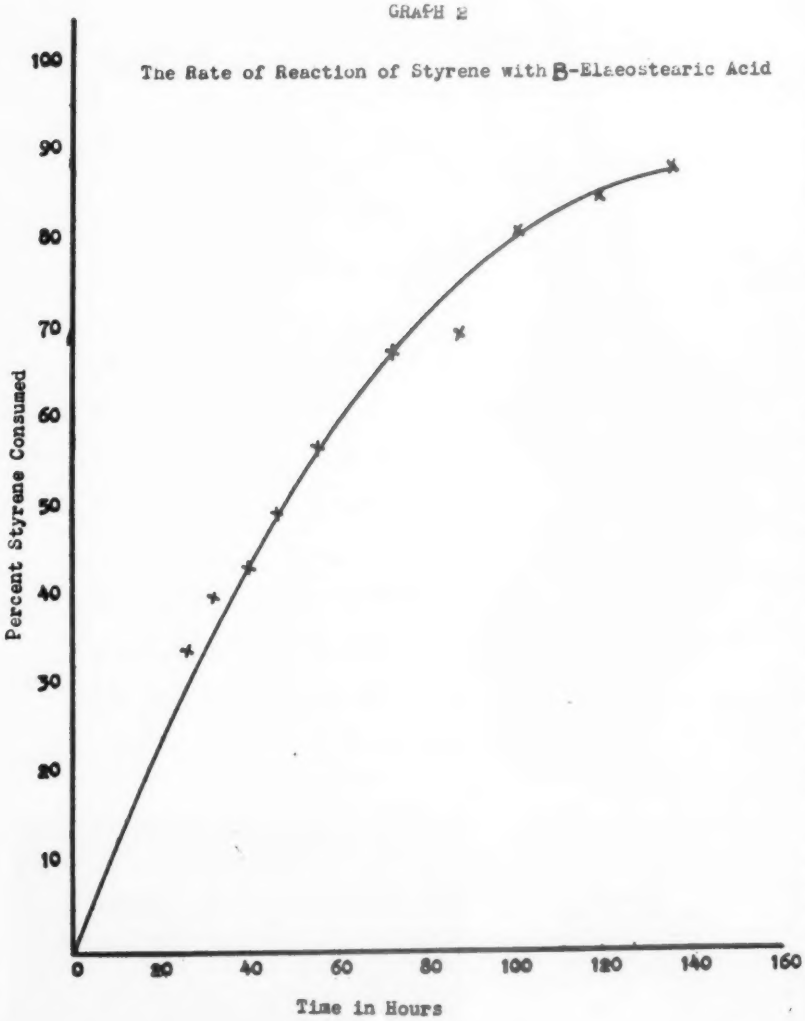
GRAPH 2



Charles W. Berl, 57, Hercules Market Survey Manager, Dies

Charles Waggaman Berl, 57, Market Survey Manager of the Sales Research Division of the Hercules Powder Company, Wilmington, Del., died October 7, in the Beebe Hospital, Lewis, Del.

He joined Hercules in 1937, as a member of the sales staff of the Virginia Cellulose Department. In 1942, Mr. Berl was named market survey manager of the Hercules Advertising Department. The Market Survey branch was transferred to the Sales Research Division this year.

From 1949-1950, Mr. Berl was on leave of absence from Hercules while serving as assistant to the chief, chemical unit, Office of Special Representatives of the Economic Cooperation Administration in Paris.

Mr. Berl was a member of the Chemical Market Research Association, the Advisory Council Market Research Directors, and the National Industrial Conference Board.

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G-E's Silicone Products Dept. Establishes Two Sales Districts

New sales districts have been established by the General Electric Company's Silicone Products Department in the East and Midwest.

Albert L. Baldock has been appointed manager of the Eastern District, with offices at 570 Lexington Ave., New York City. The Midwestern District will be managed by Constantine L. Chase, whose headquarters will be at 1105 Chester Ave., Cleveland, Ohio.

Mr. Baldock joined General Electric in 1947 as a member of the advanced scientific training program, and transferred a year later to the firm's silicone sales headquarters in Waterford, N. Y.

Silicone sales representatives with offices in Boston, New York City and Philadelphia will report to Mr. Baldock.

Mr. Chase also joined General Electric in 1947, as a member of the advanced scientific training program. He was transferred to Pittsfield, Mass., in 1948, where he has held various posts preceding his present appointment. Silicone sales representatives, with office in Cleveland, Detroit, Chicago and Cincinnati, will report to Mr. Chase.

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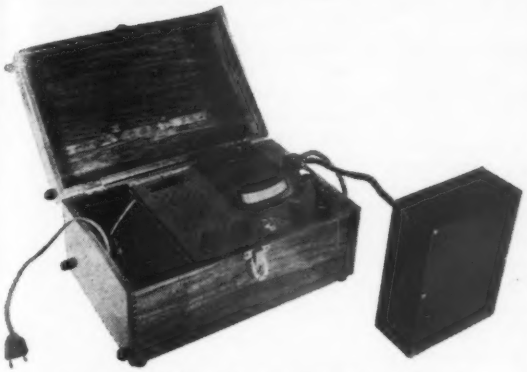

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31ST ANNUAL MEETING

(*From page 50*)

drated castor oil blends for varnishes; soybean-alkyd vehicles cut in odorless mineral spirits; aromatic petroleum solvents of various boiling ranges for use as thinners and diluents; amyl acetate for blush resistance in solvent systems of nitrocellulose containing acetone; alkyd reduction technique consisting of the use of an additive which behaves as part of the vehicle solids and which "marries" these otherwise incompatible alkyds to an odorless solvent; anti-sag, bodying and puffing agent; anti-foamer for polyvinyl-acetate system and vinyl chloride-vinylidene chloride; and latex paint thickeners.

Round Table Discussions

Water Dispersed Paints—This discussion was arranged by W. J. Greco and the panel members included H. F. Payne, moderator, H. E. Hillman, W. H. Hoback, E. C. Scholl and N. J. Timmons.

Latex paints have created two reactions amongst consumers—enthusiasm on the one hand and marked confusion on the other.

The dealer's reaction is approaching that of cautious optimism, since latex paints were first marketed. In the past they have shyed away from latex paints because the professional painter did not like to use latex paints, poor shelf stability experienced with some latex paints, and lack of understanding in the use of these paints. However if the paint sells, the dealer will naturally go along with it.

The "Do-It-Yourself" consumer has been the impetus behind the growth of latex paints, because of their unique qualities such as quick dry, low odor, ease of application, easy touch up, etc.

The biggest resistance to latex paints has been with professional painters. Factors influencing their attitude has been (1) the general bad reaction of water-based paints in the past, (2) latex-based paints are identified with the "Do-It-Yourself" market, (3) the painter is reluctant to use new application techniques for these particular paints.

The manufacturing process, especially dispersion of the pigment in synthetic latexes was given considerable attention in this discussion.

Important factors which must be considered in the manufacture of latex paints (1) pH of water, (2) control of raw materials, (3) antifoaming, (4) putrification caused by the presence of protein materials, (5) polvalent salts in the water, and (6) use of present equipment.

In dispersing pigments, it must be recognized that the binder is also a dispersion in water. The problem of dispersion is to have the pigment thoroughly dispersed in water, keep it dispersed in the binder and also keep it dispersed in the whole system during application. Water as an important ingredient in latex paints has many limitations. It has no mechanical viscosity, no wetting properties, and must be modified to accept the pigment. It was emphasized that there is no easy short-cut in the manufacture of latex paints, and every step in the process requires careful attention.

An interesting discussion on acrylic-type latex was also presented. Properties claimed for this particular latex are mechanical and chemical stability, freeze-thaw stability and viscosity stability. Film properties include good flexibility, water white color, good scrub resistance, fast dry, very little odor, alkali resistance, and retention of flexibility. It was pointed out that this particular latex may find application in paints for exterior use.

Some attention was also given to the theoretical aspects of synthetic latices in this panel discussion.

There are eight different types of synthetic latex employed today in the manufacture of latex paints. However they all have something in common—their molecular structure consists of long chains of carbon atoms with side chains. The different properties are due primarily to the type of chemical groups found in the side chains. These groups influence such physical properties as flexibility, solubility, melting point, fusion point, etc.

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MONARCH 81
low-priced channel black
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MONARCH 74
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gives good color strength and tone at moderate price
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Gadgets and Gimicks—This discussion was arranged by F. E. Petke and W. C. Kaltner.

Mr. Petke remarked that the time consumed in making a gadget to do a particular job was only a small fraction of the time saved during a period of months or years in using the gadget.

Among the gadgets discussed were a take-off knife blade adjuster for roller mills, a device for coating a very small wire with insulating varnish, large spatula, and a wash-up stick used in the cleaning of roller mills.

A part of Federation's activities included a "Gadget and Gimmick" exhibit which attracted considerable attention.

Production Planning and Scheduling—Arranged by Dr. J. W. Tomecko. Panel members included R. J. Gnaedinger, moderator, A. H. Benson, J. E. Creager, H. Einbecker, W. S. Houck and E. F. Jago.

Mr. Gnaedinger said that production planning is essential to the industry because it allows more efficient use of manpower, aids inventories and prevents overcrowding of stock.

The panel member then gave systems and methods used by their respective firms.

Putty and Caulking Compounds—Arranged by H. Kelfer and panel members included H. Kelfer, moderator, G. E. Hann, H. W. Hibbert, W. M. Lawall, and Dr. R. L. McCleary.

With the introduction of new types of window sashes to the architectural trade, it became necessary to furnish new types of putty and glazing compounds. It has been estimated that 300 million pounds of these products are sold each year.

The chemistry of putty and caulking compounds is quite involved and such factors as particle size and distribution of pigment are important in the formulation of these compounds. Other considerations discussed in detail were manufacturing techniques, raw material, and packaging.

Federal specifications dealing with putty and caulking compounds include TT-P-781, TT-P-791A, and TT-C-598. It was emphasized that these specifications were written over twelve years ago and are in need of complete revision.

Fire Retardant Paints—Arranged by Dr. M. W. Westgate. Panel members included Dr. M. W. Westgate, moderator, A. O. Allen, G. S. Cook, R. W. Craig, W. W. Cranmer, I. R. Messer, B. J. Tyler, A. W. Van Heuckeroth, and Dr. M. Van Loo.

Market potential of fire-retardant paint were discussed and it was pointed out that government and civil requirements plus private dwelling would be large consumers of fire-retardant products.

Application and means of achieving fire-retardant qualities in paint were discussed in detail. Other aspects covered included formulation, Navy and Army requirements.

CLUB PAPERS

"Solvency Characteristics of Low Odor Type Thinners"—Golden Gate Club. (Technical Committee: F. K. Wilson, Chairman, G. E. Arhart, N. Estrada, J. H. Ewell, J. J. Flinn, P. Hamlin, L. Manhart, W. C. Metcalf, J. Oscarson, J. Robinson, Jr., R. C. Shuey, and E. Wisely).

Viscosities of alkyd resin solutions were determined at concentrations ranging from 15 to 70% solids in representative low odor and odorless thinners, as well as comparable eastern and western standard type thinners for comparison. Whereas the viscosity curves with the high solvency thinners are generally straight lines with all resins tested, those with the low odor types exhibit definite change of slope over certain solids ranges. The penta type resin evidenced better dispersion in the low odor types than the corresponding glycerol type resin. The variations in viscosities observed are discussed.

"Dry Hiding Power of Paints: III'—New York Club. (Subcommittee 40: E. J. Dunn, Jr., Chairman, C. H. Baier, E. C. Bottl, A. G. Lynch, L. A. Melsheimer, E. R. Stacy, and S. Werthan).

Film thickness measurements are now made on the wet films immediately after doctor blade application. The Interchemical Wet Film Thickness Gage gives the thickness of the wet film in a matter of minutes. The surface of black and white cardboard hiding power charts are non-uniform. However, the surface of polished black and white carrara plate glass is extremely uniform. Films may be applied to these glass plates with ease and with unusually good uniformity. By instituting these two changes, good hiding power determinations are approximately one fourth the amount of work previously required. Subcommittee 40 feels the results obtained with these changes are more accurate and more readily duplicated amongst laboratories. These changes allow determinations of hiding power in the range of 700 to 800 square feet per gallon which could not be measured with cardboard hiding power charts.

"Curing Agents for Epoxy Resins"—Northwestern Club. (Technical Committee: J. Rouse, Chairman, E. Fleisher, D. Glaser, A. Olson, and H. Wittcoff).

This paper describes the results of a comprehensive series of evaluations carried out on epoxy resin coating systems in which the following cured systems have been studied: (1) Epoxy resin/polyamide resin combinations, (2) Epoxy resin/aliphatic polyfunctional amine combinations, (3) Epoxy resin/urea combinations, (4) Epoxy resin/phenolic resin combinations, and (5) Epoxy resin/fatty acid esters cured by oxidative or heat polymerization.

"Spontaneous Combustion Tendencies of Paint Vehicles"—Louisville Club. (Technical Committee: C. M. Jackson, Chairman, H. L. Brinly, R. H. Frederick, J. E. Masters, G. W. Neumann, T. A. Richie, H. E. Rose, C. H. Smith, and W. E. Veneman).

This study compares the tendencies of oils, alkyds, and varnishes toward spontaneous combustion under a standard set of conditions. Marked differences in thermo-activity were observed between various oils when used per se and when incorporated in both varnishes and alkyds of various oil lengths. Drier content influences the thermal effect in most but not in all cases. Curves showing these results are included in the paper.

"The Pigmentation of Emulsion Systems"—New York Club. (Subcommittee 44: J. Massaro, Chairman, J. J. Hendricks, W. A. Ingram, D. F. Koenecke, O. F. Lane, K. V. McCullough, J. E. Spector, F. B. Stieg, J. A. Stigile, W. M. Sullivan, and R. D. Vartanian).

A logical approach to the investigation of latex paints indicates that the most basic of all the variables involved is the method of preparation itself. Five different manufacturing procedures: (1) roller mill grinding, (2) high-speed mixing, (3) high-speed stone milling, (4) colloid mill grinding, and (5) pebble milling were compared using two latices at three pigmentation levels. An almost complete lack of regularity in the results obtained by the various methods of preparation is interpreted as an indication that exact duplication of every step of the manufacturing process will probably be necessary if reproducible results are to be expected in future work. Correlation is noted between stability and pH variation and a pH of 8.5 indicated as a possible transition point. Viscosity changes with aging appear to be related to dilution, soluble salt content, and method used in solubilizing casein.

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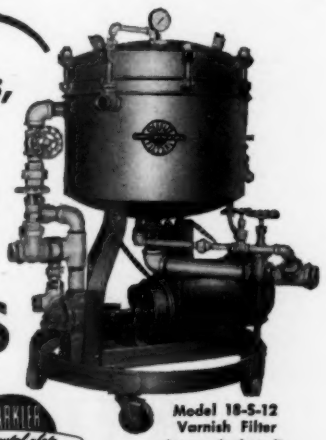

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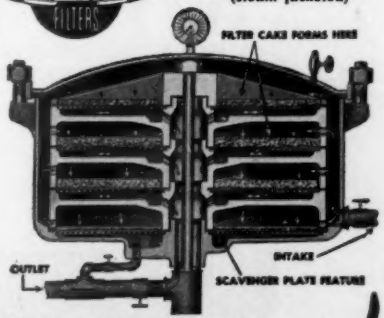

SPARKLER

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"A Comparison of Alkyd Flat, Latex, and Other Interior Wall Paints"—Baltimore Club. (Technical Committee: J. Emmerling, Chairman, M. O. Beatty, L. H. Cohan, T. J. Grumbine, Z. L. Hair, W. Lawall, C. W. Lipp, A. D. Litman, B. Ruben, and A. Steltz).

It is the purpose of this paper to compare alkyd flat enamels with latex emulsion paints, and also with two government specification semi-gloss alkyds of the conventional type. Since the latex emulsion paints were previously compared with both self sealing and hard finish oleoresinous flats, the advantages and disadvantages of the new flat enamels can be compared with most of the types of finishes which are available for the coating of interior wall surfaces. The properties studied were: can stability and redispersibility, brushing, leveling, sagging, hiding, color and gloss uniformity of the dry films painted over surfaces of varying degrees of absorption, also polishing and color changes on washing and ease of dirt removal.

"Glossmeter Design and Gloss Standards"—Detroit Club. (Standards and Methods of Test Committee: A. D. Newell, Chairman, R. C. Bradley, R. F. Monohan, W. P. Paterson, B. W. Patterson, G. L. Poy, H. W. Redshaw, and J. L. Straith).

A study of factors involved in measuring gloss of organic coatings, design essentials of electrical glossmeters, and panels of varying gloss to be used as tentative standards. Contemporary gloss-meters, give reproducible results, but future improved designs will incorporate radically difference power and measuring circuits. Application of polarized light is indicated. Reproducible degrees of gloss on standard panels are successfully obtained by using inerts in phenolic baking vehicles. Vinyl pressings from these masters furnish durable, accurate gloss standards for either visual or instrument comparison.

"The Protectometer and the Evaluation of Anti-Corrosive Primers"—M. A. Danforth, K. H. E. Larson, and Dr. W. Bosch, of North Dakota Agricultural College.

A Protectometer, designed by Bacon, Smith and Rugg was built and used in the evaluation of anti-corrosive primers that were subjected to saltspray. From a rather large number of determinations it was concluded that measurements of the electrical resistance of a protective coating on steel are a means to study the life of a primer. Composition, film thickness, pigment volume concentration were among the factors influencing the protective abilities of the paint.

"Conquering Fire"—CDIC Club. (Technical Committee: Dr. C. J. Opp, Chairman, F. E. Petke, R. R. Schomaker, and G. C. Schutte).

This paper covers various forms of fire that may occur in our industry, fire fighting material, and danger relative to certain types of fire fighting equipment used on technical type fires. Other related industrial hazards will be briefly covered.

"A Study of Vehicles and Pigments in High Heat Resistant Coatings"—Houston Club. (Technical Committee: H. C. Owens, Chairman, D. Cook, W. L. Johnson, O. Nelson, M. W. Prout, J. E. Rench, and C. P. Schlesinger).

The Houston Technical Committee evaluated two new silicone vehicles, two butyl titanate vehicles, and a series of colors for high temperature resistant properties. The two silicones were found to be superior to previously evaluated vehicles. The two butyl titanate vehicles were found to be inferior to other vehicles. The series of colors performed very well. In the process of these evaluations, an interesting correlation was observed between the heat resistant properties of a clear film, and the heat resistant properties of the same film when pigmented.

Recently Organized New York Pigment Club Holds First Meeting

The first meeting of the recently organized New York Pigment Club was held October 15, at the Kenmore Hall Hotel in New York City.

Thirty-two representatives from 17 pigment manufacturers attended the meeting presided over by Aaron Permut, Acting President of the Club.

Objectives of the new Club as outlined at the meeting are:

To provide a social and technical group whose professional interests lie in the same or similar fields.

To be a forum for discussing scientific discoveries pertaining to pigments, and developments in instrumentation which pertain to pigments.

To gather, provide, the latest books and industrial literature pertaining to pigments.

And to be a lecture hall where members may hear papers presented by fundamental researchers, raw suppliers, equipment suppliers, equipment manufacturers, educators, and Club members.

Since the members are as yet not fully acquainted with each other, it was decided to make the selection of officers tentative. Aaron Permut, Aula Chemicals, Inc., was named Acting President, and Emil Wick, General Dyestuff Corporation, was elected Acting Secretary.

By-Laws Committee members are: R. J. O'Brien, Collway Colors, Inc., chairman; M. Treade, Reichard-Coulston, Inc.; J. Pisetzner, Ansbacher-Siegle Corp.

Program Committee members are: T. D. Mutaffis, General Aniline & Film Corp., chairman; R. A. Stevens, C. K. Williams & Co.; P. Thomasset, Thomassett Colors, Inc.

The next meeting of the Club has been scheduled November 12, at 6:30 p.m., in the Kenmore Hall Hotel, New York, N.Y.

Dow Expands its Midland, Mich. Styrene-Butadiene Latex Plant

Plant expansion for the manufacture of styrene-butadiene latex used in both interior and exterior paints has been completed by the Dow Chemical Company, Midland, Michigan.

The new facilities, which began operation three weeks ago, will increase Midland's styrene-butadiene latex output 25 per cent, the company announced at the National Paint, Varnish and Lacquer Association Convention in Atlantic City, N.J.

In addition to the expanded facilities at Midland, Dow also has a latex plant at Freeport, Texas, and expects to have a third plant completed at Sarnia, Ontario, by the first of the year.

Construction of a plant for vinyltoluene, Dow's new monomer, is also nearing completion at Midland. The raw material, will be in full production in early 1954, the company said.

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Age 30, M.S. At present technical director of small specialty company manufacturing unique clear and pigmented coatings and adhesives. Excellent creative and organizational abilities. Likes hard work, and responsibility. Current salary $7,400. Box 113.

FOR SALE—Patterson Pebble Mills, porcelain lined, with Westinghouse Gearmotor and Stearns magnetic brakes, sizes 30″x42″ to 6′x5′. Day and Kent Five Roll Mills. Premier Colloid Mills, and Rotospray Strainers, McDanel Porcelain Balls, sizes 1½″ to 3″, at half price. New Simpson Mixer, size 0, type M. Send us your inquiries for the best in paint processing equipment at the lowest prices. GENERAL TRADERS, INC., 2675 W. Grand Ave., Chicago 12, Ill.

TECHNICAL Bulletins

ELECTRONIC CONTROLLERS

Bulletin describing firm's new line of Free-Vane Electronic Controllers has just been published by the Bristol Company, Waterbury, Conn. Publication lists the latest addition to the Series 500 line of instruments available as indicating or recording controllers for temperature, pressure, flow, liquid level, humidity, and time program.

Complete information on the frequency modulation principle of the control unit, plus data on the combinations of indicators or recording pens and control units available, examples of applications, and engineering specifications are contained in the fully illustrated booklet.

Bulletin B226 may be obtained by writing firm.

AUTOMATIC MIXER

Booklet just off the press gives detailed figures of experiments with automatic dry powder mixer developed by Professor Thomas Kendall and the Fisher Development Laboratories. According to booklet, experiments show that mixer is also said to be efficient for determining solubilities, extracting alkaloids or organic acids and in removing adsorbed materials from solids with appropriate solvents.

Booklet available from Fisher Scientific Company, 717 Forbes St., Pittsburgh 19, Pa.

CALCIUM CARBONATES

Witcarb V and P, precipitated calcium carbonates, are detailed in current Technical Service Report P-18 just released by the Witco Chemical Co., 260 Madison Ave., New York 16, N. Y.

Witcarb V is described as a premium extender, assuring consistency, brightness, and hiding power in oil and water-based paints. Witcarb P is designed for use as an additive for paints, and is said to eliminate sagging, maintain suspension, and reduce grinding time.

Copies available from firm.

CARBON BLACK

Brochure on carbon black dispersions has been made available by the Acheson Dispersed Pigments Co., 2250 E. Ontario St., Philadelphia 34, Pa.

The brochure lists representative formulations and suggested uses for black dispersions in practically all of the resins and vehicles in use by the plastics industry. These vehicles include resins such as polyethylene, polystyrene, vinyl, ethyl cellulose, cellulose acetate and such plasticizers as DOP, G-50 and HB-40.

Brochure may be obtained by writing firm.

STEEL STRAPPING

Current issue of Confab, Acme Steel Company's 12-page quarterly publication devoted to cost-saving applications of steel strapping and wire stiching, is just off the press.

Publication contains six feature articles, three short photo-caption stories, an announcement of the firm's steel strapping contest and an editorial on "Rebirth of Freedom of Opportunity," by Carl J. Sharp, president of Acme Steel.

Copies of the issue may be obtained without cost by writing firm at 2814 Archer Ave., Chicago.

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Write for Technical Service Report E-4.

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BASIC MATERIALS

Publication of "Materials for Product Development—1953," the text of discussions at the first Basic Materials Conference held in New York City last June has been announced by Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y., producers of the Conference and Exposition.

Book contains elaborate discussions of the many modern materials now available for the production of goods. Eighteen papers are included along with 36 tables and 30 graphs. The 265-page volume also includes the text of 83 questions and answers offered at the conference.

Topics covered include, Aluminum, Titanium, Materials and the Atomic Age, etc.

Book is being sent without charge to those who participated in the conference. Others may obtain it from Clapp & Poliak for $7.50 postpaid.

LIFT TRUCK OPERATION

Fifth edition of booklet, "How To Operate A Lift Truck," has been published by the Hyster Company, 2902 N. E. Clackamas St., Portland, Oregon. Publication, designed for lift truck operators, supervisors, safety engineers and other interested industrial personnel, contains information on the operation of a lift truck, preventive maintenance, safety and basic materials handling, and drawings for setting up an obstacle course.

Booklet available without cost.

CMC DATA

New information about applications for the Hercules Powder Company's technical grade sodium carboxymethylcellulose is contained in a revised edition of technical booklet about this product.

Called CMC-CT, this water-soluble cellulosic is being used in a variety of applications. According to booklet, water-soluble cellulosic films can be deposited by the evaporation of water solutions of CMC-CT. Properties of product are said to make it suitable in laundry finishes and in water-based paints. For copy write firm at Wilmington, Del.

EMULSIFIER

Bulletin No. 38 brings up to date information regarding Emcol H-50A, a useful aliphatic hydrocarbon emulsifier designed for emulsion degreasing, fuel oil disludging, agricultural spray oils and other applications.

Copies available from The Emulsol Corporation, 59 East Madison St., Chicago.

LEVEL INDICATOR

New Telstor electronic level indicator is illustrated and described in eight-page bulletin just released. Instrument features simplified circuitry, accuracy to ± 2 per cent, and continous indication at remote or local stations. Copies of bulletin available on request to Fielden Instrument Division, Robertshaw-Fulton Controls Co., 2920 N. Fourth St., Philadelphia 33, Pa.

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POLYSTYRENE EMULSIONS

Properties and characteristics of four Koppers Polystyrene Emulsions, stable water dispersions of high molecular weight polystyrene, are described in a compact 32-page technical bulletin published by the Chemical Division of Koppers Company ,Inc.

The bulletin describes the uses and applications of these emulsions in reinforced plastics, water-base coatings, primers and sealers, paper coatings, and textiles.

Instructions for use of these emulsions, designated R, M, P, and F, are also contained in the publication, with tables listing compatible organic and inorganic pigments.

Copies of Technical Bulletin C-3-180 will be sent upon request to Koppers Company, Inc., Chemical Division, Koppers Building, Pittsburgh 19, Pa.

FURFURYL ALCOHOL

Booklet devoted to furfuryl alcohol has just been published by the Chemicals Department of the Quaker Oats Company, Merchandise Mart, Chicago 54, Ill. Available without cost upon request from interested companies, the 28-page booklet contains information on commercial handling, physical data, chemical reactions and established uses of furfuryl alcohol.

The booklet is divided into five main sections and includes an appendix which discusses such things as the specific gravity and pound per gallon of furfuryl alcohol at various temperatures; density of furfuryl alcohol—water solutions as a function of composition; solubility of various gums, resins, and plastics in furfuryl alcohol.

AEROSOL SURVEY

Bulletin on aerosol and pressurized products survey in 1952 has been issued by the Chemical Specialties Manufacturers Association, 110 East 42nd St., New York 17, N. Y.

Figures for the number of pigmented and metallic paints units sold are included in the release.

Literature also includes the list of companies which reported data for inclusion in the survey conducted by the Association.

STEEL DRUMS

Brochure which tells how sheet steel is prepared for fabrication into Rheem drums is offered by the Rheem Manufacturing Company, 570 Lexington Ave., New York, N.Y. Titled, "Why You Should Use Clean and Durable Rheem Drums," publication includes descriptions and illustrations of shot blasting to remove rust and scale, rolling to give smooth and level surface, scrubbing and rinsing, spraying of a permanent rust inhibitor to both sides of the sheet, roller-application of a special caring, and a curing process in which the coating is baked-on to produce an exceptionally durable finish.

Also shown are comparison photographs of Rheem drums and other types after 18 months of exposure in a climate of heavy rainfall and high humidity.

DOCKBOARDS

"Look into These Facts About Dockboards," title of new bulletin prepared by the Magnesium Company of America, East Chicago 19, Ind., presents information on magnesium dockboards used to bridge the gap between loading docks and rail cars and highway trailers.

Separate sheets, housed in permanent file folder, relate instances where makeshift plates cost firms using them more money than the cost of a dockboard fitted to specific needs.

CHEMICAL PRODUCTS

Seventy-fifth Anniversary catalog, contains account of Consolidated Chemical Industries, Inc.'s history, growth and numerous products.

Well illustrated, the 104-page publication contains photographs of the firm's eleven plants, product descriptions, specifications, technical data and packaging and shipping information.

Copies of catalog may be obtained by writing the firm at 630 Fifth Ave., New York 17, N. Y.

CELLULOSE POLYMER

The viscosity build-up of Eastman Chemical Products' half-second butyrate is compared with an older material, in chart just released by the firm, at Kingsport, Tenn.

Chart illustrates the comparison in a typical balanced solvents system.

SCIENTIFIC DICTIONARY

Fourth edition of "Stewart's Scientific Dictionary," by Jeffrey R. Stewart, F.A.I.C., former Assistant to the Quartermaster General, Department of Defense, Washington, D. C., is now available.

This reference volume defines the generally accepted terminology of the more widely used terms and materials in the Chemical Process Industries which embrace such fields as paint, abrasives, adhesives, industrial chemicals, rubber, plastics, packaging materials, etc.

Approximately 800-pages, the book may be obtained by sending $10.50 (postage and insurance included) to Stewart Research Laboratory, "Forest Gate" at Franconia, Alexandria, Virginia. Discounts for quantity orders.

NEWSLETTER

The October issue of Fred'k A. Stresen-Reuter, Inc.'s newsletter has just been issued.

This monthly report on product news and technical developments contains items on the firm's Naphthenate Driers, Fume Control, and a new Micro-Pulverizer installed at the firm's Bensenville plant.

Copy may be obtained by writing Stressen-Reuter at 2113 Medill Ave., Chicago 47, Ill.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, AND CIRCULATION REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233) of PAINT AND VARNISH PRODUCTION, published monthly at Easton, Pa., for October 1, 1952.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: John Powell, 855 Avenue of the Americas, New York City.
Editor: Anthony Errico, 855 Avenue of the Americas, New York City.
Managing editor: None
Business manager: None

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.) Powell Magazines, Inc., 855 Avenue of the Americas, New York City.

John Powell, 855 Avenue of the Americas, New York City.
Ira P. MacNair, 254 W. 31st Street, New York City.
Alice L. Lynch, 855 Avenue of the Americas, New York City.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only).

JOHN POWELL, publisher

Sworn to and subscribed before me this 19th day of October, 1953
(SEAL)

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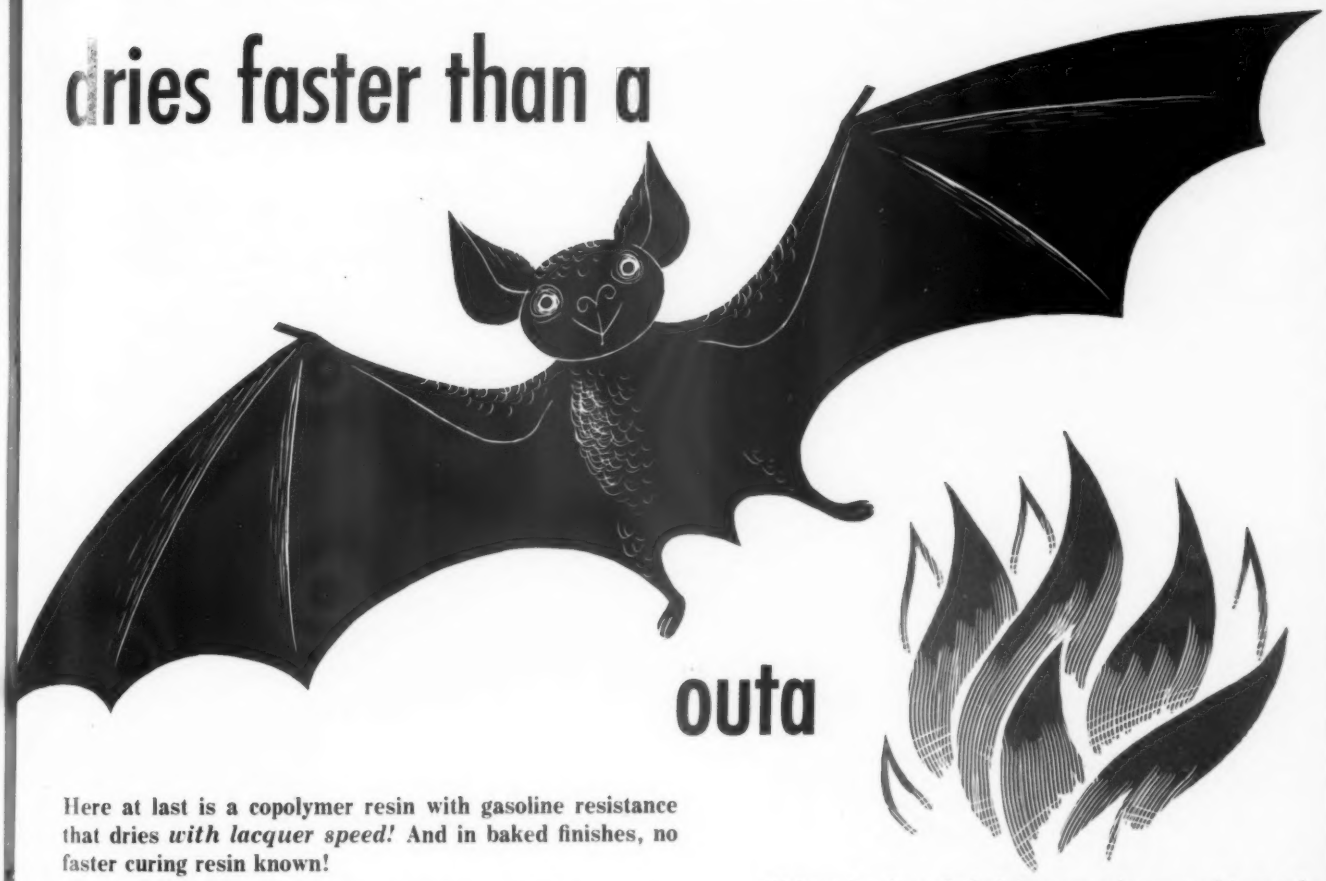
New CYCOPOL® Resin 320-5

dries faster than a



outa

Here at last is a copolymer resin with gasoline resistance that dries *with lacquer speed!* And in baked finishes, no faster curing resin known!

CYCOPOL 320-5 offers excellent resistance to aliphatic hydrocarbon solvents. After only seven hours drying, air dry films will even withstand immersion in gasoline without wrinkling, blistering or loss of gloss. You also get very good hardness, chemical resistance and still more resistance to bronzing and chalking.

How's this for SPEED?

	(Method 406.1, Federal Specification TT-P-141b)	
AIR DRY	Dust Free	5-10 Minutes
	Tack Free	10-15 Minutes
	Dry Hard	Less than 30 Minutes
BAKE	300° F	5 Minutes
	250° F	5-10 Minutes
	200° F	10-15 Minutes

SUGGESTED USES

- Automotive Finishes
- Industrial Enamels
- Pump Enamels
- Floor Finishes
- Railway Finishes
- Machinery Finishes
- Toy Enamels
- Implement Enamels

Write today for technical data, samples, or assistance of a Cyanamid Technical Service Representative.

QUALITY • UNIFORMITY • SERVICE

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intensive research, rigid control, prompt delivery

AMERICAN Cyanamid COMPANY

PLASTICS AND RESINS DIVISION

30 Rockefeller Plaza, New York 20, N. Y.

In Canada: North American Cyanamid Limited, Royal Bank Building, Toronto, Ontario
5550 Royalmount Avenue, Montreal, Quebec

HYDRITE FLAT has what it takes for a good extender pigment

- COMPATIBILITY
- DISPERSABILITY
- SUSPENSION STABILITY
- INERTNESS
- LOW PRICE

FLAT

For *latex* emulsion paints, particularly, **HYDRITE FLAT,** newest of the hydrated aluminum silicates, fills the specifications for a good flatting agent. It permits high pigment volume concentration while maintaining good film integrity. It is non-reactive and the basic material is carefully selected and processed to reduce soluble salts to a minimum. It is notable, also, for its dispersability and its ability to remain in suspension.

In every way **HYDRITE FLAT** possesses the desirable characteristics of an extender pigment, both in process and in use. And it imparts a desirable degree of flatness that is unsurpassed by any materials of this type.

Send for sample and further information.

HYDRITE FLAT

CHEMICAL PROPERTIES: Hydrated aluminum silicate. Non-reactive toward either acids or alkalies. Controlled low soluble salts.

COLLOIDAL PROPERTIES: Readily deflocculated by common dispersing agents, e.g., caseinates, polymerized phosphates, etc. Compatible with both aqueous and non-aqueous vehicles.

GEORGIA KAOLIN COMPANY

433 North Broad Street, Elizabeth, N. J.

HYDRITE FLAT